Labour market inequality at the post-secondary level in South Africa: Understanding employment and earning outcomes among graduates and diplomates

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Abstract

This study explores labour market inequality amongst those with post-secondary education in South Africa. The need to invest in higher education has been emphasised as the gateway to facilitating equal opportunities in the labour market, with the view of bridging inequality in employment and incomes. Nevertheless, South Africa's labour market remains highly unequal, despite higher rates of enrolment and completion in higher education. The existing body of literature suggests that labour market outcomes amongst those with post-secondary education are not equal, consequently widening the level of inequality within the economy. Using the Quarterly Labour Force Survey 2014 annual dataset a combination of descriptive statistics and econometric tools are employed to investigate employment and earnings outcomes between graduates and diplomates. The findings indicate that graduates are more successful in obtaining employment relative to diplomates even once demographic and geographic characteristics and field of study are controlled for. Moreover, graduates obtain a substantial earnings premium relative to diplomates even when controlling for job characteristics.

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Chapter 1: Introduction

1.1. Introduction

The role of higher education has been underscored as a gateway to facilitating equal opportunities within the labour market. Yet despite higher enrolment rates and completion of higher education qualifications in South Africa over the years, the country's labour market remains highly unequal. Compounding matters, a number of studies have highlighted a rising trend in graduate unemployment,[1] thus prompting questions surrounding the relationship between higher education and labour market outcomes. While the existing literature has sought to understand labour market outcomes amongst graduates, there is inconsistency in the definition of a 'graduate'. Most studies define graduates as individuals with any form of post-secondary qualification, thus potentially masking the differences in labour market outcomes amongst those with different qualifications. In this context, this dissertation seeks to investigate labour market inequality amongst those with post-secondary education in South Africa, by way of exploring the employment and earnings outcomes of graduates and diplomates separately, and by their field of study.

1.2. Background

Burdened by the legacy of apartheid, South Africa remains characterised by high levels of income inequality (notwithstanding a rising middle class in recent years), a high unemployment rate, and a large number of people in poverty. Further, the burden of these problems is distributed unevenly across the race groups (Keswell, 2004). In its 20 years in power, the government has sought, through policy reforms, to combat issues of inequality; however, this has not been an easy task. Literature has shown that labour market income inequality in particular has been one of the main drivers of inequality in South Africa (Branson et al, 2012), and given the country's history, this is further defined by race. In general, the White population group has higher income levels than Africans, and this is further intensified by high capital accumulation amongst Whites (Finn, Leibbrandt, and Woolard, 2009). Income inequality, and inequality more generally, can be observed, and is often perpetuated, within the country's labour market.

The role of improved schooling has been a central part of development strategies of most

[1] Bhorat, 2004; Pauw et al. 2006b.

countries and of international organisations (Hanushek, 2013). The need to invest in higher education particularly has been emphasised as the gateway to facilitating equal opportunities in the labour market, with a view to bridging inequality in employment and incomes. Nevertheless, South Africa's labour market remains highly unequal, despite higher rates of enrolment and completion in higher education. The Department of Education (DoE) distinguished inequality in education (access and quality thereof) as one of its most vexing issues, and has therefore sought to place equity strategies at the heart of its transformation plan. It noted that inequality within the economy, and more particularly, in incomes, limits the ability of individuals, households and the government to finance education and training in a bid to develop the requisite skills to improve labour market participation and consequently, income (Department of Education, 2001).

Indeed, statistics show that the prospects of better labour market outcomes are pronounced amongst individuals with higher education qualifications (post-matric qualifications). A report compiled by Statistics South Africa (StatsSA) (2014) confirms this in a number of ways. Firstly, the report shows that individuals with a tertiary qualification had the highest transition rates into employment, at 9.6% in 2014, while transition rates for individuals with a matric, and those with less than a matric qualification where much lower at 8.2% and 5.2% respectively. Secondly, unemployment (based on the strict[2] definition) amongst individuals with tertiary education stood at 10.8%, compared to a rate of 29.7% amongst individuals with less than a matric qualification, suggesting that the rate of unemployment decreases with higher levels of education. Thirdly, in terms of employment, a third of the working-age population with less than matric were employed, compared to 8 out of 10 for individuals with tertiary education. Even in respect to earnings[3], those with higher education qualifications have better prospects. Another StatsSA report analysing monthly earnings of South Africans, showed that earnings amongst paid workers rose with the level of education. The median monthly earnings for those with a higher education qualification were 2.9 times higher than

[2]There are two definitions of unemployment, namely strict and broad. Strict unemployment refers individuals within the economically active population who a) are without work in the week prior to the survey, b) are available and willing to work within a week of the survey, c) have actively been seeking work or start a business within four weeks of the survey being conducted. The broad definition excludes (c).

[3] The focus is now shifted from "income" towards "earnings", as income typically refers to income from all sources and is often measured at the household level (household income) while earnings tend to be measured for individual employed persons.

those who had completed secondary schooling, and 6.7 times higher than those who had completed primary school (Statistics South Africa, 2010).

Nevertheless, there is growing unemployment amongst graduates in South Africa. This is despite the notion of higher education as the silver bullet in the context of the structural changes in the labour market that have resulted in a slant towards more specialised skills. The rate of unemployment (strict definition) amongst those with tertiary education rose on average by 7% between 2008 and 2015. In contrast, unemployment amongst individuals with no schooling, and among those with primary schooling, declined on average by 7% and by 3% respectively over the corresponding period. Meanwhile unemployment among those with secondary education rose marginally by 1% (StatsSA, 2016). It should be noted however that the proportion of those unemployed with tertiary education is quite small relative to those with lower levels of education completed. Nonetheless, the apparent rising trend should not be ignored as it brings to light questions surrounding the relationship between higher education and labour market outcomes, necessitating an understanding of the likelihood of employment given the attainment of different kinds of higher education qualifications.

An understanding of the role of education and labour market outcomes could not be more appropriate in South Africa, given the current socio-economic landscape - a landscape categorised by increasing protests, strike action, riots and disruptive social episodes due to the glaring income and social disparities, and varied access to education. While the ministry of education has indeed made efforts to address entrenched race, gender, class and institutional inequalities within higher education in a bid to grant individuals equal opportunities in the labour market (Department of Education, 2001), a growing literature (Moleke, 2005a; Pauw et al., 2006a; Dias and Posel, 2007; Bhorat et al, 2012) suggests that labour market outcomes of graduates do not provide equal opportunities for all, consequently widening the level of inequality within the economy.

1.3. Research Area and Questions

1.3.1. Problem Statement

There has been a growing (yet still limited) literature seeking to understand labour market destinations amongst graduates in South Africa, in the context of rising unemployment, and a general shortage in skills within the economy. While the studies have shed some light in terms of labour market outcomes amongst those with higher education

qualifications, Kraak (2012) and Van der Berg and van Broekhuizen (2012) note that there has been a degree of inconsistency in what has previously been defined as a graduate within the discussion around graduate unemployment. Specifically, they note that previous studies define graduates as individuals with any type of qualification at the tertiary level. This, in their view, can easily mask differences in labour market outcomes for individuals with different higher education qualifications. Consequently, this dissertation seeks to analyse the differences in labour market outcomes specifically between graduates and diplomates.

A graduate is defined as:

A holder of a minimum of a three year qualification, (a Bachelors Degree), and any form of higher qualification (Bachelors and Postgraduate Diploma, Honours Degree, and Higher Degree).

The minimum admission requirement for the entry into the Bachelors Degree is a National Senior Certificate (NSC) as certified by Umalusi[4] with an achievement rating of 4 (Adequate Achievement, 50- 59%) or better in four subjects from the recognised 20-credit NSC subjects (within a designated subject list)[5].

A diplomate is defined as:

A holder of a minimum of a three year qualification (a Diploma), and any form of higher qualification (Higher Diploma, Masters and Doctorate Diploma).

The minimum admission requirement into a Diploma is a National Senior Certificate (NSC) as certified by Umalusi with an achievement rating of 3 (Moderate Achievement, 40- 49%) or better in four recognised NSC 20-credit subjects.

It is important to distinguish between graduates and diplomates given the clear differences in the cognitive requirements for each qualification, which could potentially contribute to the variations in labour market outcomes between the two. In addition, degrees and diplomas are often offered in different fields of study, and thus investigating the effect of

[4] South Africa's council for Quality Assurance in General and Further Education and Training

[5] These are Accounting, Agricultural Sciences, Business Studies, Dramatic Arts, Economics, Engineering, Graphics and Design, Geography, History, Consumer Studies, Information Technology, Languages, Life Sciences, Mathematics, Mathematical Literacy.

field of study on labour market outcomes may help unpack the differences between graduates and diplomates.

1.3.2. Research Questions

This study seeks to make a contribution to the literature by way of investigating labour market inequality amongst those with post-secondary education. The study will make use of the Quarterly Labour Force Survey 2014 annual dataset. The benefit of this dataset is that it collects information on the field of study for individuals who have completed a post-secondary education qualification across all ages, unlike earlier labour force surveys which typically collected information from individuals who were currently enrolled in post-secondary education at a given point in time.

Two main questions are posed in this dissertation:

1. What are the differences in the employment and earnings outcomes between graduates and diplomates in South Africa?

2. What factors (for example, age, race, gender etc) help to account for these differences? In particular, does field of study drive some of the difference?

More specifically, this will be done exploring employment and earnings outcomes between graduates and diplomates, using nationally representative data from the Quarterly Labour Force Survey 2014 annual dataset.

1.4. Organisation of dissertation

The paper consists of 6 chapters, and is organised as follows: Chapter one outlined the motivation and established the importance of understanding labour market outcomes of those with post-secondary qualifications in the South African context of high inequality. Chapter Two presents an overview of the theoretical and empirical literature on post-secondary education and labour market outcomes. Chapter Three provides a description of the secondary data used and an outline of the methodology employed to conduct the analysis. Chapter Four presents a descriptive overview of graduate and diplomate profiles using a number of characteristics (demographics, field of study, employment status). This chapter also provides a snapshot of estimated earnings of the two groups across the abovementioned characteristics. Chapter Five lays out the regression analysis together with a discussion of the

findings, while Chapter Six summarises and concludes with the main findings of the paper.

Chapter 2: Literature Review

2.1. Introduction

Having outlined the purpose of this dissertation in the previous chapter, I will proceed to outline the broad literature surrounding the topic. Below I provide an overview of the theoretical framework which will inform the study, followed by a discussion of the empirical findings in the existing literature on graduate employment and earnings in South Africa, as well as in the international literature.

2.2. Theoretical Framework

The most commonly cited theoretical frameworks within the literature of education and labour market and earnings outcomes are the Human Capital and Signalling (or Screening) frameworks. These two frameworks are both important in conceptualising labour market and earnings outcomes among those with post-secondary education. Additionally, I will discuss the Segmented Labour Market Theory, which serves as an insightful framework to analyse South Africa's labour market in the context of the country's history.

2.2.1. Human Capital and Signalling Frameworks

Human capital is defined as the stock of knowledge and skills obtained throughout various stages in life, through education, work experience and on-the-job training and" (Becker, 1964). Notably, the role of education is increasingly being recognised as one of the most important components through which the stock of knowledge is acquired (Borjas, 2016). It is for this reason that the role of education is used as a lens through which we can better understand human capital accumulation and the associated returns. For instance, it has been recognised that education has an important effect on wages in particular (Chevalier et al., 2004). In seeking to better understand this outcome, one of the main focus areas in the literature is the mechanism through which this occurs. Particularly, a question that continues to be deliberated on is whether the gains from education are a result of increased productivity, or rather a reflection of productivity, thus introducing the human capital and signalling frameworks. While each of these theories differ in terms of their constructs, they share common ground in that education is ultimately viewed as an investment (Cai, 2012).

In principle, the human capital framework suggests that the stock of knowledge and skills improves productivity in labour (Salvatore, 2011). Therefore, the acquisition of knowledge and skills is considered an investment given that it generates positive returns, such as the scope for more labour market opportunities as well as higher earnings over time (Borjas, 2016). Thus, more educated individuals acquire skills and abilities that can enhance their job performance, thus making them more successful in the labour market than others (Cai, 2012). Developed in the 1960s, and expanded on throughout the years, the Human Capital framework exists as a body of theories, consisting of the work of Schultz (1961), Becker (1964) and Mincer (1958) amongst others.

Schultz presented a contribution to the human capital framework, carving out the notion of human capital as an investment. He recognized that the upskilling of individuals could be viewed as building human capital, which in turn has the same properties as labour and physical capital gains in economic production (Little, 2002). Making another significant contribution to the existing framework, Jacob Mincer developed a model in which he hypothesised human capital (education and training) as the driving factor behind higher wages amongst occupations which require education and training (Teixeira, 2014). The idea here is that individuals with different levels of education receive different wages based on the respective knowledge and skills acquired with each additional stage of learning (Gonçalves (1999) cited in Bildirici et al., 2005).

Nevertheless, while the framework acknowledges differences in earnings across different levels of education, Mincer (1958), in his research on personal income distribution, observed differences in wages within occupations. He set out that differences in inter-occupational wages arise due to differences in training, while differences in intra-occupational wages arise when taking into account job experience, in which case time becomes a crucial factor in the model. The main idea here is that while individuals are young, they invest in themselves, often foregoing current earnings as they would be enrolled in school. Therefore, in the early stages of their careers earnings are quite low. However, as investment in human capital declines, when individuals begin to complete school and shift towards full-time employment, earnings begin to rise as the returns to investments are realised (Ben-Porath, 1967:352). Consequently, beyond the acquisition of higher levels of education, age and experience become important factors when considering the earnings trajectory of individuals. These two factors reflect the assumption that knowledge and skills are acquired through time, often through on-the-job training, which

thus enhance productivity.

An alternative to the human capital framework is signalling theory. Developed by Spence (1973), the theory suggests that there are two groups of individuals, low productivity workers, and high productivity workers. Due to market asymmetries, the labour market does not have full information on which group a given individual is in. Consequently, employers need to make use of their discretion when making an assumption about a potential candidate. The framework assumes that the cost of acquiring education is much cheaper for high productivity individuals making them more likely to acquire additional levels of education relative to their low productivity counterparts. Because human capital, from an employer's perspective is seen as an investment, it is therefore in the employer's interest to seek to employ individuals who appear to have a requisite amount of skill and aptitude in order to make the most optimal and profit maximising decision (Cai, 2012). Thus, in order to make this decision in the screening process, employers make use of the information at hand the level of education and the individual's qualification as a signal of the individual's productivity. This process essentially captures the issues of labour market asymmetry, wherein the market does not hold full information on the individuals applying for a job (Cai, 2012). Therefore, the framework theorises that those with more education earn more due to the fact that their qualification provides them with a credential that reflects productivity to employers (Page, 2010: 33).

Education: An agent of productivity or symbol of productivity?

Research has sought to uncover whether education plays a productivity-enhancing role, a signalling role, or a combination of the two. However, this has not been without its challenges (Borjas, 2016). Some of these challenges are ascribed to the difficulty that arises from distinguishing between the two theories, given that most of the empirical implications are quite similar (Arteaga, 2016). Arteaga (2016:2) notes that while the human capital and signalling theories are not mutually exclusive "the decision processes of firms and workers are the same: Firms weigh the productivity of workers with different levels of education against their wages, and select the education level that maximizes profits; workers weigh the increased wages against the cost of education and choose the level of education that maximizes their utility. In both settings, higher-ability workers obtain higher levels of schooling and are paid more.". Nevertheless, a number of studies have tried to empirically assess which of the two theories best explains the role (or value)

of education.

Capitalising on a change of curriculum at Universidad de los Andes in Colombia in 2006, wherein the institution decided to reduce coursework required in fulfilment of a degree in economics and business, Arteaga (2016:18) uses this as “an ideal natural experiment for learning about signalling vs. human capital”. She hypothesises that wages “should fall under the human capital model” as the reduction of courses learned would effectively imply a reduction in productivity. She goes on to add that wages should “remain constant under signalling” given that under this theory the qualification itself would present a signal of productivity to the market regardless of the number of courses it took to complete the qualification (due to information asymmetries one cannot expect employers to necessarily be aware of changes to the curricula of all institutions) (Arteaga, 2016:17-18). Her findings suggest that the human capital theory plays a crucial role in wage determination, and rejects the signalling theory as the only mechanism reflecting the value of education (Arteaga, 2016:18).

Finding similar results are Zhu and Zhu (2011), who make use of a sample of graduates from newly-upgraded colleges in China to test the very same theories. They make use of the Wiles test, which is used as a method to test whether the positive relationship between education and higher earnings is due to increased productivity associated with the level of education, or through signalling of productivity. The Wiles test postulates that the signalling theory holds true in the case wherein income between graduates with jobs in line with their field of study do not differ significantly from income of graduates with jobs that are not in line with their field of study; otherwise, the human capital theory holds true (Zhu and Zhu, 2011). They find that earnings were much higher amongst graduates employed within their respective fields of study, compared to graduates employed outside of their field of study thus indicating that education enhances productivity as opposed to merely signalling the level of productivity.

Contrary to these findings Van der Merwe (2010), who conducted a study on the experiences of graduates from Durban University of Technology, finds more evidence of the signalling theory than the human capital theory. Also making use of the Wiles test, he tests the correlation between earnings and the level of education and the correlation between earnings and subject content. He hypotheses that "the larger the correlation between earnings and the level of education and the lower the correlation

between earnings and subject content (as in whether graduates' jobs are related to their training/field of study), the truer is screening theory and the less true is the human capital interpretation of the economic value of schooling" (Van der Merwe, 2010: 114). He finds a positive and significant relationship between earnings and higher education, while the human capital variable[6] holds a negative and statistically significant coefficient against earnings, thus supporting the signalling theory rather than the human capital theory.

Most literature tends to ascribe educational value to either one of the theories. However, Kjelland (2008) argues that investment in education becomes more of an expense (in terms of money and time) in the event that education serves merely as a signal, without any form of contribution to raising an individual's level of productivity (thus enhancing capital). He adds further that it becomes an ineffective signal considering that education does not necessarily reflect the most productive individuals.[7] Indeed, while Van der Merwe's (2010) findings suggest more evidence of the signalling theory, he argues that the results do not rule out the existence of a human capital mechanism. Instead, he points out that the human capital and signalling theories together may in fact account for the economic value of education, stating that the negative relationship between human capital and earnings may reflect graduates entering their first jobs through internships wherein their earnings are initially suppressed, such that with time and experience, the relationship with earnings may become positive. This ultimately confirms the human capital notion of experience and knowledge acquired through time which then enhance productivity. This confirms the view that the value of education can in fact be explained by the two theories.

While indeed both the human capital and signalling frameworks have their merits, and can certainly explain the occurrence of higher wages amongst the more educated, neither one has gone without criticism. For instance, Hwang (2016) argues that the screening method can give rise to slightly less productive outcomes. He points out that individuals have an incentive to work much harder in a bid to reveal their "hidden productivity" when employers do not make an assumption of productivity based on the type of qualification, whereas in the case that employers make the assumption that the qualification reveals the "hidden productivity" of an individual, individuals become discouraged from work as it

[6] This variable considers whether graduate's jobs are related to their field of study.

[7] Kjelland (2008: 70) notes that one should consider instances wherein individuals decide not to pursue higher education dues to financial constraints or that they irrationally perceive lower expected returns to higher education than comparable students.

becomes hard to prove themselves (Hwang, 2016:88). Meanwhile the human capital framework has received criticism over its somewhat generic assumptions, which do not necessarily take into account the fact that the correlation between education, work and earnings varies based on a number of characteristics, such as "country, field of study, type of institution, arrangements for financing education, industry, employment site, and over time" (Marginson, 2015:15). Nevertheless, these theories form an important basis for understanding differences between graduates and diplomates.

As mentioned in the previous chapter, higher cognitive skills are demanded for entry into a bachelor's degree compared to the requirement for entry into a diploma. Therefore, according to the human capital theory, this would imply that graduates, given higher cognitive skills and better education, are more productive than diplomates, consequently giving rise to better labour market outcomes and higher earnings. Similarly, in the case of the signalling theory, the higher the level of education, the stronger the signal, implying that graduates send stronger signals to employers than diplomates. While it may very well be that differences in educational attainment account for varied labour market and earnings outcomes, there are a host of other characteristics which may result in differences in outcomes.

2.2.2. Segmented Labour Market Theory

Borjas (2016: 362) highlights that "differences in earnings and employment opportunities may arise even among equally skilled workers employed in the same job simply because of the workers' race, gender, national origin, sexual orientation, or other seemingly irrelevant characteristics". Consequently, more consideration has been given to alternative frameworks that account for these differences in recent years. The segmented labour market (SLM) theory is one of these. While the theory is also referred to as the dual labour market theory, it does not necessarily mean that segmentation occurs only in two groups; this is done more for convenience (Basu, 1997; cited in Fields, 2009).

A segmented labour market arises when "an individual with a given sets of skills encounters jobs that differ in terms of the wage paid or other conditions, such that some jobs are preferable to others. Moreover, access to the better segments of the labour market, those offering the good jobs, is restricted" (Cazes and Verick, 2013: 70). The SLM theory is essentially an adaptation from the standard labour market model. The point of departure of the SLM model is the aggregation of resources; it separates the labour market into

different groups, taking into account that resources inherently have different characteristics, which ultimately may give rise to different labour market outcomes despite similar education attainment. The main assumption is that all participants of the labour market seek better jobs, however some of the better jobs are available only to a select few within the labour market (based on a host of credentials such as race, education, gender, etc). Consequently, individuals who are not able to secure these jobs either take on worse jobs or remain unemployed (Fields, 2009). Therefore, the SLM theory, unlike the human capital framework and signalling theory, attempts to provide a better representation of how differences in certain factors (such as race, sex, education, as well as industry groupings amongst others) can affect labour supply, labour demand, and wage-determination dynamics within different segments of the economy. In particular, segmentation can give rise to social and economic costs and implications, such as wage gaps between different segments, varied access to training and employee benefits, as well as differences in general working conditions (Deakin, 2013).

This theory is relevant particularly in South Africa's labour market, given the country's history of Apartheid and the dual economy, and broader issues of inequality. For instance, there is evidence that suggests that the labour market and wage determination tend to be segmented by race and gender in South Africa, thus further widening inequality between employment and earnings in the country (Bhorat, 2004; Keswell, 2004; Leibbrandt, et al., 2010; Van der Berg, 2010). Additionally, McCord and Bhorat (2003) and Altman (2003) list education, occupation, industry and geographical area as additional factors in which labour market and wage determination tend to be segregated. To be clear, from a racial and gender perspective, the argument is not necessarily that the labour market today is segmented such that there is outright racial and/or gender profiling when considering labour market outcomes and wage determination, but rather that these elements are remnants of the apartheid regime in which there were cases of outright racial and gendered segmentation within the labour markets through wage-discrimination and limited labour mobility policies, which affect our labour markets today (McCord and Bhorat, 2003).

This is further compounded in the context of the economy's structural shift towards more specialised skills that often come with education, perpetuating and extending a racialised and gender based split within the labour market. Altman (2003), who draws on a number

of studies[8], notes that traditionally, a large proportion of women have had less access to quality education and employment opportunities, consequently, with the structural changes in the economy, women typically have been mostly represented in relatively low skilled, low productivity sectors distributing low wages – such as clerical, sales, service work, waitressing, beauty, or cleaning services. It is therefore essential to consider gender, as well as types of occupations, amongst other factors, when considering the elements that could potentially discriminate against individuals with otherwise equal qualifications (diplomas or degrees).

2.3. Empirical Findings

2.3.1. International Literature

This paper seeks to investigate labour market inequality among South Africans with post-secondary education, however it is important to note that labour market inequality amongst those with tertiary education is a global issue. This section will therefore draw on the existing international literature to highlight some of the observed patterns and trends globally.

While the international literature focuses on both employment and earnings outcomes of graduates, there is a much broader body of literature on earnings relative to employment outcomes. Given the fairly low unemployment rates in most developed economies, and by association graduate unemployment, employment probabilities are perhaps less of a concern. Instead, issues surrounding job mismatch as well as earnings amongst graduates forms the majority of the international literature. I will provide an overview on the literature on earnings.

Machin and Puhani (2003) contribute to the literature on wage inequality by exploring labour force surveys of the United Kingdom and Germany. Their work shows that the type of subject degree is one of the determinants of gender related wage differences amongst university graduates. In particular, after controlling for age, industry, region, part-time and public sector employment, the subject degree explains roughly 2 to 4% of higher wages of male graduates relative to their female counterparts. Using labour force data from the UK from the year 2002, Walker and Zhu (2003) find that wages vary quite significantly between different subject fields. In particular, they find much higher coefficients for Law,

[8] Altman, 1993; Casale, 2002; Moleke, 2005a and Woolard & Woolard, 2005.

Health, Economics and Business, and Mathematics than Arts, Education, and other Social Sciences (see also Blackaby et al. (1997) with similar results in a UK study).

Adding further to the literature, Lindley and McIntosh (2015) explore whether wage inequality amongst graduates in the UK is between or within subjects. They point out the importance of establishing which of the two has been the main driver of inequality by stating that increases from between subjects would suggest that changes in the relative wage returns to various subjects reflect changing demand and supply factors for each subject. They find that wage inequality between subjects was quite minimal, and that it was within-subject inequality that caused most of the variation in graduate wages. They attribute this to the variation in childhood cognitive test scores amongst those with the same degree subject, as well as the widening variety of jobs performed by graduates with a degree in the same subject.

International literature has also explored the impact of education quality on earnings. Stevenson (2016) makes use of a representative survey of the students who obtained bachelor degrees from accredited United States institutions of higher education in 1993, to run an econometric model (Dubin-McFadden) testing the correlation between education quality and earnings. He finds the results of this analysis to be mixed. He finds that education quality (measured by a ranking system that all graduates could agree on) has a premium in the fields of Business, Medicine, and Law, while it has a negligible return in the field of Health Sciences.

2.3.2. Graduate labour market outcomes in South Africa

Pauw et al. (2006a) make a contribution to the South African literature by exploring the graduate unemployment issue. They make use of data from Statistics South Africa between 1995 and 2005, two graduate tracer studies conducted by the Human Sciences Research Council (HSRC), as well as a firm survey across some of South Africa's largest companies in a range of sectors. They highlight that the graduate unemployment problem is either likely to be a result of labour market's inability to absorb new graduate entrants, or a result of graduates obtaining inadequate qualifications. However, in the context of South Africa's skills shortage they argue that it is most likely to be a case of the latter, alluding to the differing employment prospects owed to the type of qualification (degree or diploma) and field of study.

In a bid to better understand this issue, research has sought to explain some of the factors that drive employment, and graduate labour market destinations. While much previous research has shown that race and gender remain significant determinants of employment outcomes (Moleke, 2005a; Dias and Posel, 2007; Bhorat et al, 2012), there have been a few studies ascribing differences in labour market outcomes to the field of study. For instance, Moleke (2005a) makes use of a survey conducted by the HSRC on graduates from South African universities who obtained their qualifications between 1990 and 1998, and finds that graduates within the field of Humanities and Arts were the most likely to be unemployed (with a 48.2% probability of unemployment), followed by the field of Education. Meanwhile graduates from the Economic and Management Sciences, and Natural Sciences had relatively lower rates of unemployment. In contrast, Rogan and Reynolds (2015) who conduct a graduate tracer study from Rhodes University and the University of Fort Hare for graduates who completed a three or four year degree in either 2010 or 2011, find that Humanities graduates are more than twice as likely to be employed than Science, Engineering and Technology (SET) and Business graduates. However, their results were not statistically significant.

It is possible that employment outcomes vary by field of study, however, the literature suggests another core issue is poor training, or the perception of better quality training in Historically Advantaged Institutions (HAIs) compared to Historically Disadvantaged Institutions (HDIs). Beyond the separation between degree and non-degree tertiary qualifications, and the field of study, research has explored the differences in graduate outcomes between HAIs and HDIs, with the broad findings that individuals with a qualification from HAIs tend to be less likely to be unemployed than their counterparts from HDIs (Moleke 2005a, Rogan and Reynolds 2012, Bhorat et al 2012, Van der Berg and Van Broekhuizen 2012).

The South African literature suggests that in addition to demographic factors such as race and gender, field of study as well as the perceived quality of education create some form of bias in employment outcomes. In the context of a highly unequal income distribution in South Africa, understanding whether the abovementioned factors also influence graduate earnings is important, as it potentially suggests that even with the attainment of similar skills, graduates, depending on certain demographic characteristics, will continue to earn differently – further widening income inequality within the country. The literature on graduate earnings in South Africa is not as rich as the international literature, however

there is one study that presents findings on this. Bhorat et al. (2012) measure the effect of a number of factors on graduate[9] earnings amongst South African graduates, using a cohort analysis that traces the non-completers and graduates of 2002-2003 from seven selected higher education institutions to their final labour market destination. They find that when controlling for the field of study in regression analysis, variables such as gender, race and institution have a limited effect on earnings differentials. This is an encouraging outcome, as it suggests in their view, that while there could be gender and racial bias in employment, this is not quite the case when it comes to earnings.

2.4. Contribution of this study

This paper will contribute to the existing literature in three ways. Firstly, by distinguishing between graduates and diplomates, one will be able to investigate whether there is a premium to having a degree versus a diploma, and how large the premium is relative to other characteristics correlated with employment and earnings. Secondly, this paper analyses the field of study, which is arguably an important determinant of employment and earnings outcomes amongst those with a post-secondary education, and may help account for the difference in labour market outcomes between graduates and diplomates. Thirdly, while most of the existing studies conducted tracer surveys[10] in which graduates were interviewed, this paper makes the use of the Quarterly Labour Force Survey (QLFS). The QLFS dataset provides a large nationally representative sample, therefore results and findings from the estimations can be extrapolated to South Africa's population. This will allow for a broader understanding of employment and earnings outcomes across the country. More importantly the QLFS started collecting information on the field of study for all adults with a post-schooling qualification in 2012. This is in contrast to other studies which typically provide this information only for individuals who are currently enrolled. This will therefore provide a unique contribution to the existing literature in that field of study across all age groups will be analysed using nationally representative data.

[9] They exclude certificate/diploma qualifications from their definition of graduates.

[10] Moleke (2005a), Moleke (2005b), Bhorat et al (2012), Van der Berg, S. and Broekhuizen, H. (2012), and Rogan and Reynolds (2015).

Chapter 3: Research Methodology

3.1. Introduction

As described above, this study seeks to investigate two main factors:

1. The differences in the employment and earnings outcomes between graduates and diplomates in South Africa; and
2. What factors assist in accounting for these differences, with a particular focus on the field of study.

A number of statistical tools will be employed in order to investigate the abovementioned factors. This chapter therefore provides a framework of the methodological tools that will be employed. In the first section of this chapter the QLFS dataset, which will be used for the purpose of this study, will be discussed. Section 3.2 provides some detail on the sample and the descriptive statistics. Section 3.3 specifies the econometric tools to be employed. Section 3.4 provides the description as well as the composition of all the variables used in the model. Lastly, Section 3.5 presents some of the limitations of the study.

3.2. Data

The QLFS is a nationally representative household-based sample survey conducted by South Africa's statistics agency, Statistics South Africa (Stats SA). The survey collects information per quarter from a sample of approximately 30 000 dwellings in which households reside. It collects data on the labour market activities of individuals aged 15 years and above who live in those households. As mentioned above, the benefit of using the QLFS dataset, in comparison to the data that other research has previously made use of, is the larger sample size relative to the others as well as the fact that the QLFS is representative of the South African population. Additionally, unlike the earlier labour force surveys which typically collected information from individuals who were enrolled in their studies in a given year, the QLFS collects information on the field of study for individuals who have completed a higher education qualification across all ages. In other words, regardless of *when* they graduated, all working age adults are asked about the field of study if they reported that their highest level of education was at the post-secondary level. This makes an analysis of labour market dynamics controlling for field of study across all age groups possible. The National Income Dynamics Survey (NIDS) collects much richer information than the QLFS, however the

sample size is quite small, at 10 367 dwellings, compared to the QLFS dataset. This sample becomes even smaller when looking specifically at the graduate sample. While NIDS collects field of study information, this is only provided for individuals who were enrolled within the two years prior to when the survey is conducted.

The QLFS datasets for the four quarters of 2014 have been combined to form the annual dataset. The sample size for the QLFS is roughly 30 000 dwellings per quarter. StatsSA's household-based surveys use a master sample of primary sampling units (PSUs), with a sample size of 3080 PSUs. The sample size is divided equally into four panels referred to as rotation groups. The rotation groups are formulated such that each group has the same distribution pattern as that observed in the entire sample. The groups are numbered from one to four, with each number corresponding to the quarters of the year in which each sample will be rotated for the particular group (StatsSA, 2014).

Given that this study seeks to estimate inequality in earnings, in addition to employment access, one would need to identify an appropriate earnings variable in the dataset. The QLFS dataset, which is released 4 weeks after the end of each quarter, does not contain an earnings variable, although the questionnaire asks the following question: "*What is your annual/monthly/weekly/daily/hourly wage or salary before deductions*?". This information is only published in the annual dataset, where StatsSA provides earnings data in annual averages in a bid to increase the precision of the earnings data (StatsSA, 2010). Therefore, the study will make use of the annual QLFS dataset (2014), which includes an earnings variable for the year.

3.3. Sample and descriptive analysis

I restrict the analytical sample to persons from the age of 20 years, in order to capture the age at which some individuals may have completed at least a diploma or a 3-year qualification. I also exclude all individuals who are currently enrolled for any studies; in other words, I analyse those who have completed their education. From this group, I create the graduate and diplomate samples, with an observed total of 6356 and 8490 respectively out of a total number of 189735[11] observations adults of working age within the sample. Using the population weights provided by StatsSA, graduates and diplomates account for roughly 4.6%

[11] Given the repeated surveying of the same individuals (between the different quarters), there are 189735 observations of adults of working age within the sample, however only approximately 65000 are different individuals.

of South Africa's population who are aged 20 and above and are not currently enrolled.

Descriptive statistics will be presented in Chapter 4 in order to compare the profiles of graduates and diplomates (and also the full-adult[12] sample for comparative purposes). The first set will consist of general summary statistics of individual characteristics, the field of study, and labour market status. The second set of summary statistics will include the characteristics of those who are employed, namely, the type of employment, the occupation level (skilled, semi-skilled, and low-skilled)[13], and the last set will present earnings by the abovementioned characteristics.

3.4. Estimations

While Chapter 4 provides an overview of some of the characteristics of graduates and diplomates, as well as which factors may potentially influence employment and earnings outcomes between graduates and diplomates, this on its own will not be enough to draw a conclusion on the outcomes. The descriptive statistics are unable to account for the simultaneous interactions between a number of variables with the dependent variables. Therefore, this study will make use of two econometric models to test the simultaneous effect of certain variables on employment and earnings outcomes, an employment probability model and a Mincerian earnings function.

3.4.1. Employment Probit

The first estimation will involve a probit model[14] in order to investigate the factors that are likely to be correlated with the probability of securing employment among those with higher education, given by the equation:

$$PR(Y = 1|X = x) = \emptyset(x'\beta),$$

[12] Includes all adults between the ages of 20-65, who are not currently enrolled.

[13] 'Skilled' includes Manager, Professional and Technician occupations; 'Semi-skilled' includes Clerk, Sales and services, Skilled agriculture, Craft and related trade and Plant and machine operator occupations; 'Low skilled' includes Elementary and Domestic worker occupations.

[14] A probit model is a regression which seeks to test the probability of a given event taking place and is appropriate where the dependent variable is a binary categorical variable. In this case the event is given by the dependent variable, employment, which is a binary variable.

where Y is a binary dependent variable equal to one if the individual is employed, and zero if unemployed (according to the broad definition); X is a vector representing the independent variables. Among the independent variables will be the main variable of interest, namely a dummy variable equal to one if an individual is a graduate (zero if a diplomate), as well as factors commonly included in similar equations for South Africa such as gender, race, age group, geographic characteristics such as urban residence and province in which a given individual may reside. Additionally, field of study will be included in order to estimate how the addition of this variable affects the premium on graduate education. Lastly, an alternative specification will incorporate interaction terms between the graduate dummy and field of study in order to test whether there may be an interaction between the two variables, such that their effect on the dependent variable may be more than additive, and multiplicative instead. In other words, the interactions will be testing whether there is an additional benefit to being a graduate with a degree in the field of management studies for example, compared to being a diplomate with a diploma in that same field of study.

3.4.2. Earnings Function

An earnings function will be estimated on a reduced sample of graduates and diplomates who succeed in finding employment, using a standard Ordinary Least Squares model. I will estimate a standard Mincerian earnings equation of the form:

$$\ln(W_i) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 \ldots . + \varepsilon_i$$

Where $\ln(W_i)$ (the dependent variable) is the log of hourly earnings for individual i; and x represents the independent variables used in the probit model, namely a dummy variable equal to one if a graduate (zero if a diplomate), as well as factors commonly included in similar equations for South Africa such as gender, race, age group, urban residence and province of residence. Field of study, as well as a set of interaction variables between the graduate dummy and the field of study variables will be included as in the employment probit. Additionally, a specification that includes employment characteristics such as the type of occupation, as well as the type of employment (i.e. whether an individual is an employee, or an employer or own- account worker) will be estimated. The variables included in the regression will be discussed in more detail below.

3.5. Description of Variables

3.5.1. Dependent variable

The first dependent variable is 'employment', which will be used in the employment probit, and the second is earnings, which will be used in the earnings function.

Employment variable

The employment variable is computed from the 'Status' variable that is provided in the dataset by StatsSA. The 'Status' variable is derived from a logical series of questions about work activity within a given week, using Question 2.4a, Question 2.4b, Question 2.4c, Question 2.5a, Question 2.5b and Question 2.7 from the questionnaire. 'Employed' is defined as individuals who worked for at least an hour in the previous week, or had a job or business. 'Unemployed' refers to individuals who, were not employed in the reference week, those who actively looked for work or tried to start a business 4 weeks prior to the survey, and who were available to work. 'Discouraged' refers to individuals who were not employed during the reference period, wanted to work or were available to work but did not take active steps to do so, given that there were no jobs available in the area, or unable to find work matching their skill. 'Not Economically Active (NEA)' includes those who are neither employed or unemployed. The breakdown of the 'Status' variable is as follows: 1 = Employed, 2 = Unemployed, 3 = Discouraged job seeker, 4 = Other NEA. From this, the employment variable is created, where 1 = Employed and 0 = Unemployed and Discouraged job seeker.

I use the broad definition of unemployment which includes those unemployed that stated that they were willing and able to work, but who had not actively searched for employment in the previous four weeks. Unlike for the general adult population, the difference between the strict and broad rates of unemployment for those with post-secondary education is small though, as will be shown in Chapter 4 below. In sensitivity analyses, I check whether my results change when I use (a) the strict definition of unemployment instead, and b) I include in the zeroes of the dependent variable also those who fall under the Not Economically Active (NEA) group. The tables have been included

in the Appendix (where Table A.4 includes the set of regressions using (a) as the dependent variable, and Table A.5 includes the set of regressions using (b) as the dependent variable.) and the results of these test will be discussed further below in Chapter 5.

Earnings variable

The second dependent variable is the log of hourly earnings which was computed using earnings information for employees and the self-employed (namely, employers and own account workers) as well as information on the number of hours worked in a week.

The StatsSA dataset provides two earnings variables, the first for employees, and the second for employers and own account workers. Both variables are derived from two questions asked in Section 5 of the questionnaire which cover earnings in the main job for employees, employers and own-account workers aged 15 years and above. The first question that is asked is "*In your main job, what is the easiest way for you to tell us your wages or salary before taxes or any other deductions?*"[15], wherein the individual has to specify one from the following: monthly, weekly, fortnightly, daily, hourly, annually, refused/ don't know. A second question, "*What is your (choose one) annual/monthly/ weekly/daily/hourly wage or salary before deductions? (Include tips and commissions)*"[16], is then asked of those who ticked any of the first six options. These two questions are used to derive the two monthly earnings variables released in the public use data. However, these two variables exclude individuals who answered 'refused/don't know' in the first question, who were subsequently pointed to Question 5.8[17] wherein they could specify which earnings category they fell into, with selection from either one of the weekly, monthly, or annual columns.

In order to account for this, and create an earnings variable that includes all individuals, I created two new earnings variables, one for employees and the another for employers and own account workers, which essentially augment the point values provided by the two derived income variables provided in the dataset with the answers provided in Question 5.8 which are in brackets. To start off with I converted the bracketed earnings into point estimates, using the midpoint method which essentially assigns the midpoint of each

[15] Question 5.2 for employees, and question 5.6 for employers and own account workers.
[16] Question 5.4a for employees, and Question 5.7a for employers and own account workers.
[17] All individuals, regardless of being an employee or an employer and own account worker are referred to this particular question.

income category as the point estimate. I then proceed to augment the two derived income variables provided in the dataset with the midpoint values to create a new monthly income variable[18].

From this point, I then divide this variable with the number of reported hours worked within a week (Question 4.18) to create the hourly earnings variable. Roughly 13% of graduates/diplomates were left with missing reported hours worked. Therefore, the total number of observations for the hourly earnings variable comes to 10 337 out of 11 988 number of graduates and diplomates combined.

3.4.2. Independent variables

The set of independent variables will assist in determining whether employment and earnings outcomes are the same among equally qualified individuals, or whether there are other factors which might potentially influence employment and earnings outcomes. This is of importance given the literature that suggests that labour market outcomes are quite different even amongst those whom have obtained the same (or similar) qualifications.

Individual characteristics

Gender Variable: Computed as a dummy variable where one is equal to "female" and zero is equal to "male".

Age Variable: A categorical age variable was created where the first category includes all ages between 20 – 29 years; the second includes all ages between 30 – 39 years; the third includes all ages between 40 – 49 years; the fourth includes all ages between 50 – 59 years; and the last category includes all ages between 60 – 65 years. For the purposes of this study, we examine individuals from the age of 20 years in order to realistically capture those who might have completed a degree but cut off the sample above 65 years to exclude those likely to be in retirement. A set of age dummies are included in the regressions.

[18] After augmenting the two income fields, roughly 13% of graduates/diplomates are left with missing reported earnings. Therefore, the total number of observations for the monthly earnings variable comes to 12030 out of 14 846 number of graduates and diplomates combined.

Race Variable: Race is included as a set of dummy variables that represents the various population groups in South Africa namely, African, Coloured, Indian/Asian and White. This variable is of particular importance given the country's racial dynamics.

Geographical characteristics

Geography type variable: This is a categorical variable that accounts for the type of area in which a given individual may reside, where 1 = Urban Formal; 2 = Urban Informal; 3 = Tribal Areas; 4 = Rural Formal. A set of dummy variables are included in the regressions to represent these.

Province variable: This variable is included as a set of dummy variables for the nine provinces in South Africa, namely Western Cape, Northern Cape, Eastern Cape, Free State, KwaZulu-Natal, North West, Gauteng, Mpumalanga, and Limpopo.

Field of Study

This variable is of particular importance for the purposes of this study. As mentioned earlier, examining field of study will provide a unique contribution to the literature given that the field of study for graduates/diplomates across all age groups is available in the data. Field of study is argued to be an important determinant of employment and earnings outcomes, which may help account for the difference in labour market outcomes between graduate and diplomates.

The QLFS dataset provides a variable, based on Question 1.8 in the questionnaire, which contains the field of study across 38 different fields. The first 24 fields provide the information on qualifications obtained from University/Technikon/College, and the remaining fields provide information on all qualifications obtained from Further Education and Training (FET) institutions. Running an analysis with 38 different fields of education would prove unwieldy (and the FET fields of study would only apply to the diplomates). I therefore proceeded to create a new field of study variable which essentially combines the reported fields of study into fewer fields. For ease and consistency, I made use of the faculty breakdown from the University of Pretoria, which consists of 8 Faculties, with over 60 qualifications offered. The Faculty breakdown includes the following categories: Economic and Management Sciences; Education; Engineering, the Built Environment and Information Technology; Health Sciences; Humanities; Law; Natural Sciences; and Theology (which was combined with 'other' subject fields). The formal breakdown is

provided in the *Appendix*. Table A.1 in the appendix provides the University of Pretoria's Field of Study breakdown by Faculty. Table A.2 provides the breakdown of field of study as specified in the QLFS questionnaire (Question 1.8). Important to note here, is that the QLFS dataset assigns some graduates' field of study under the FET category. This is likely to reflect misreporting at the survey level, where individuals fill in their field of study under the incorrect category. For instance, fields such as 'Management', 'Marketing', and 'Finance, Economics and Accounting' that are commonly offered as bachelors degrees at Universities, are listed under the FET category only and not under the University/College category. Thus, it may be that individuals complete Question 1.8 based on the name of their qualification obtained, without necessarily selecting their respective qualifications based on whether they attended a University/Technicon/College or a FET. Table A.3 shows how the Field of Study categories from the QLFS were assigned to each of the categories provided by the University of Pretoria. Table A.4 provides a breakdown of field of study between graduates and diplomates, which will be described further in the following chapter.

Job characteristics

The following characteristics will only be included in the earnings function, as they cannot be tested in the employment probit given that these characteristics only occur once one has successfully secured a job.

Occupation: Occupation is included in three broad categories, namely skilled occupation semi-skilled labour, and low-skilled labour, which were derived from the occupational variable provided in the StatsSA data. Legislators, senior officials and managers; Professionals; Technical and associate professionals fall under skilled labour. Under semi-skilled labour, are the following occupations; Clerks; Service workers and shop and market sales workers; Skilled agricultural and fishery workers; Craft and related trade workers; Plant and machine operators and assemblers. Lastly, Elementary occupations and Domestic workers qualify as low-skilled labour.

Employee: This is a dummy variable which describes whether a graduate or diplomate is an employee (equal to one), or an employer or own account worker (equal to zero).

3.6. Limitations

Among post-secondary educated individuals, the literature has emphasised the differences in earnings and labour market outcomes arising from the quality of education. More particularly in the case of South Africa is the importance of assessing HAIs and HDIs as a key determinant of labour outcomes in the country. One of the limitations of this study, despite being able to compare graduates versus diplomates as well as the field of study, is that I will not be able to assess the role of quality of education within these categories on employment and earnings outcomes. The QLFS does not collect information about the quality of education or whether an individual attended an HDI or HAI.

Further limitations will arise from the empirical analysis. Firstly, given that I will restrict the analytical sample to persons that have completed either a diploma or a bachelors degree from the age of 20-65, this may give rise to a sample selection bias. Sample selection bias occurs in the event that a sample is drawn such that certain segments of the population are unlikely to be represented (Steyn et al., 2007). Those that are included are a non-random sample of the broader population. For example, the kinds of individuals who complete a tertiary degree/diploma and become employed may be inherently different from those who do not (i.e. they may be more motivated, an aspect that is unobservable in the data). Consequently, this may give rise to biased employment and earnings regression results. While there are a number of econometric models that can be used to detect and control for sample selection bias, this is beyond the scope of my work and I will therefore not be able to control for this.

Secondly, the issue of endogeneity, which I cannot account for given the data available, is set to arise. Endogeneity is the case wherein there is a correlation between an independent variable and the error term in a model. This occurs due to unobserved characteristics that cannot be accounted for. In this case, one will not be able to observe characteristics such as ability and motivation, which are likely to be correlated with the choice of degree versus a diploma, the choice of field of study as well as the likelihood of employment and earnings.

Chapter 4: Descriptive Statistics

4.1. Introduction

As described earlier, there is existing literature that seeks to better understand labour market destinations of those with post-secondary education. However, the literature is largely based on smaller surveys or of recent graduates and it generally fails to distinguish between different kinds of post-secondary qualifications. Consequently, it becomes difficult to understand the characteristics of individuals with different kinds of post-secondary education, which may ultimately be the cause of differences in labour market outcomes. With this in mind, this chapter provides a descriptive analysis of graduates and diplomates in South Africa.

It is important to distinguish between graduates and diplomates, given the clear differences in the cognitive requirements for each qualification which could potentially contribute to variations in labour market outcomes between the two groups. However, beyond differences in qualification, it is important to acknowledge that differences in labour market outcomes are also likely to be influenced by a host of other characteristics. Consequently, it is of value to examine the characteristics of these two groups separately from each other.

While this chapter will provide a descriptive analysis of characteristics commonly analysed in labour market studies, such as gender, race, age, province and occupation, it also includes field of study. Given that degrees and diplomas are often offered in different fields of study, understanding which fields graduates and diplomates specialise in may further unpack some of the key differences between the two groups.

4.2. General Statistics

Table 4.1 presents general statistics across three main sample groups namely, the graduate sample, the diplomate sample, as well as the full adult sample of the population which includes all individuals between the ages of 20 and 65, who are not currently enrolled. The table indicates that less than 7.8 percent of the adult population have a degree/diploma in South Africa. Although higher than the average of 5.1 percent for developing countries, this is comparatively low relative to advanced countries with an estimated average of 14.5

percent[19] (Barro and Lee, 2010).

The table indicates that 49 percent of the full adult sample of working age consists of females. Females are marginally over-represented in the graduate sample relative to the full adult sample with 50 percent of graduates being female, while females are underrepresented with about 46 percent of diplomates being female.

A fairly unsurprising outcome is that Africans account for the majority of the full adult sample, with a representation of 78 percent, followed by Coloureds, Whites and Indians at 9.7 percent, 9.4 percent and 2.9 percent respectively. This distribution differs quite significantly from the graduate and diplomate samples. In both samples, the African population is underrepresented when compared to the full adult sample. Africans account for around 45 percent of the graduate sample, while accounting for 60 percent of the diplomate sample. Meanwhile, Whites have a much higher representation within both the graduate and diplomate samples relative to the full adult sample group. Whites are almost as highly represented as the African population within the graduate sample, with a share of 41 percent. In the diplomate sample Whites have a much lower representation relative to the African population, with a representation of around 28 percent; nonetheless this is much higher than the share of Whites in the working age population. This lays out an interesting picture as it suggests that even though the African population group is the largest within the country, the attainment of higher education remains largely skewed in favour of the White population group (shown to be overrepresented in the graduate and diplomate samples), while the African population group remains largely underrepresented within higher education. In part, this can be ascribed to legacy issues. For instance, the African population aged above 40 would have had a lack of opportunities to study further during apartheid. Therefore, when calculating an average across the full population age range, these individuals are included, which skews the education attainment in favour of whites. We would expect the racial distribution of higher education to be much more equitable in the younger cohorts, which would indicate progress towards the DoE's goals.

When looking at the age categories, very little seems to differ across all three sample groups. Almost half of each sample group lies within the two age groups of 30 to 39 years and 40 to

[19] Barro and Lee (2010) estimate tertiary attainment rates across 24 advanced countries and 122 developing countries for every 10 year period between 1950 and 2010. The OECD has more recent figures (2015), with an average of 34.8 percent for OECD countries (age range of 25 – 64 years of age).

49 years. As we can expect the last age group of 60 to 65 year olds is the smallest.

The last part of Table 1 provides a breakdown of field of study across the graduate and diplomate samples. About a third of each sample has a qualification in the field of Economic and Management Sciences, followed by the field of Education with a share of around 20 percent in each sample. There are more diplomates than graduates within the field of Engineering and Built Environment and Information Technology (19.3 percent versus 12.7 percent). There is a marginal difference between graduates and diplomates within the fields of Health Sciences, Humanities, and Natural and Agricultural Sciences with shares of around 8 percent, 10 percent and 40 percent respectively. Within the field of law, there is a larger share of individuals within the graduate sample relative to the diplomate sample.

Table 4.1: General Statistics (percentage distribution across categories)

	All Adults[a]	**Graduates[b]**	**Diplomates[c]**
N	189735	6356	8490
Gender			
Female	49.1 (0.002)	50.4 (0.008)	45.7 (0.007)
Male	50.9 (0.002)	49.6 (0.008)	54.3 (0.007)
Race			
African	78.0 (0.001)	47.9 (0.008)	62.1 (0.007)
Coloured	9.7 (0.001)	5.8 (0.003)	7.7 (0.003)
Indian / Asian	2.9 (0.001)	8.1 (0.005)	4.5 (0.003)
White	9.4 (0.001)	38.2 (0.008)	25.7 (0.006)
Age			
20 – 29	28.6 (0.001)	18.8 (0.006)	19.3 (0.005)
30 – 39	29.0 (0.001)	28.0 (0.008)	34.4 (0.007)
40 – 49	21.4 (0.001)	28.3 (0.007)	26.0 (0.006)
50 – 59	15.0 (0.001)	18.6 (0.006)	15.0 (0.005)
60 – 65	6.0 (0.001)	6.3 (0.004)	5.2 (0.003)
Field of Study			

Economics and Management Sciences	26.4 (0.008)	27.9 (0.007)
Education	21.5 (0.006)	20.3 (0.005)
Engineering, the Built Environment and Information Technology	12.7 (0.006)	19.3 (0.006)
Health Sciences	7.9 (0.004)	9.4 (0.004)
Humanities	15.0 (0.006)	9.3 (0.004)
Law	5.4 (0.003)	1.1 (0.001)
Natural and Agricultural Sciences	4.5 (0.003)	3.7 (0.002)
Other	6.6 (0.004)	9.0 (0.004)

Source: Annual Labour Force Survey 2014.
Notes: Standard errors in parentheses. Except for N, which shows sample size, estimates are weighted using population weights.
[a] Sample consists of all persons between the age of 20 – 65 and not currently enrolled.
[b] Graduate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65 and not currently enrolled.
[c] Diplomate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65 and not currently enrolled.

4.3. Employment Status

Table 4.2 below provides an overview of employment statistics for the full adult sample, as well as the graduate and diplomate samples. It also goes on to compare the unemployment rates among the graduate and diplomate samples with those for the full adult sample.

The statistics below confirm the notion that individuals with higher levels of education are more likely to be successful in obtaining employment relative to those without. For instance, eight out of ten in the graduate and diplomate samples are employed, compared to the full adult sample in which five out of ten are employed. Encouragingly, the discouraged unemployed group, which refers to those who are not actively searching for work, is much smaller in the graduate and diplomate sample; under two percent is non-searching unemployed compared to the full adult sample which stands at eight percent.

The same is true when looking at the Not Economically Active (NEA) group, which generally comprises individuals who are either retired or homemakers. Less than ten percent of the graduate and diplomate samples are NEA compared to 23 percent of the full adult sample.

Table 4.2: Employment Status

	All Adults[a]	Graduates[b]	Diplomates[c]
Employment Status			
Employed	52.0	84.4	80.3
	(0.002)	(0.006)	(0.005)
Unemployed	17.0	5.3	9.3
	(0.001)	(0.003)	(0.004)
Discouraged	8.0	0.9	1.8
	(0.001)	(0.001)	(0.002)
Other NEA	23.1	9.4	8.7
	(0.001)	(0.005)	(0.004)
Unemployment Rates (%)			
Strict	25.2	5.7	10.3
Broad	33.6	6.7	12.3

Source: Annual Labour Force Survey 2014.
Notes: Standard errors in parentheses.
[a] Sample consists of all persons between the age of 20 – 65 and not currently enrolled.
[b] Graduate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65 and not currently enrolled.
[c] Diplomate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65 and not currently enrolled.

As expected, the rate of unemployment in the graduate and diplomate samples are four and two times lower than that of the full adult sample respectively (both in terms of the strict and broad definition)[20]. In line with Bhorat et al (2014), the higher rate of unemployment within the full sample compared to the more educated samples of graduates and diplomates potentially highlights a much larger supply of those with lower forms of education relative to those with higher education. In essence, this reflects the state of South Africa's labour market which has a shortage of skilled individuals relative to labour market demand and an abundance of those with lower forms of education relative to what the market demands.

It is also important to note that the unemployment rate is almost twice as high for diplomates as for graduates (5.7 percent and 10.3 percent - strict definition; and 6.7 percent and 12.3 percent- broad definition). This underlines the importance of distinguishing between these

[20] The unemployment rate for the full adult sample differs slightly from the national unemployment rate of 25.5% (strict) and 34.0% (broad). This is most likely due to the different age range used for the adult sample here (20 – 65 years) compared to the age range of 15 – 65 years used for the national unemployment rate.

two groups in labour market analyses.

4.4. Employment Type

The table 4.3 below provides information on the nature of the employment of graduates and diplomates. In particular, it shows that a large majority (85 percent for graduates and 90 percent for diplomates) of the employed graduate and diplomate samples are employees. The remainder of the sample is split between employers (ten percent for graduates and six percent for diplomates), own account workers (five percent and three percent respectively for graduates and diplomates), and a marginal share (less than half a percent) of those who help without pay in a household business.

Table 4.3: Employment Profile

Variable	**Graduates[a]**	**Diplomates[b]**
N	*5488*	*6801*
Working for someone else for pay	84.9 (0.006)	90.0 (0.004)
An employer (employing one of more employees)	9.8 (0.005)	6.3 (0.003)
Own Account Workers (not employing anyone)	4.9 (0.004)	3.3 (0.002)
Helping without pay in a household business	0.3 (0.001)	0.4 (0.001)

Source: Annual Labour Force Survey 2014.
Notes: Standard errors in parentheses. Except for N, which shows sample size, estimates are weighted using population weights.
[a] Graduate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65 and not currently enrolled, and employed.
[b] Diplomate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65 and not currently enrolled, and employed.

There is no a substantial difference in the distribution of employees versus self-employed in both the graduate and diplomate samples, although graduates do appear somewhat more likely than diplomates to be self-employed, and less likely to be wage employed. However, for the remaining descriptive statistics below, I will distinguish between the two groups (employees versus self-employed) in a bid to investigate whether there are any differences in labour market outcomes (i.e. occupation and earnings) between these two groups.

Table 4.4 provides a breakdown of the distribution of occupations among graduates and diplomates, disaggregated by employment type (i.e. whether an individual is an employee or an employer/ own account worker). As noted in Table 4.3 the proportion of employees is significantly higher than that of employers and own account workers, hereafter referred to as the self-employed, however it is worthwhile analysing labour market outcomes separating these groups from each other as they may be involved in different kinds of activities.

Broadly speaking, the statistics below show that there are significant differences in terms of the occupational split between the employees and the self-employed. For instance, the proportion of legislators, senior officials and managers within the self-employed group is more than twice that of employees. Meanwhile the proportion of self-employed clerks is less than a 10^{th} of the employee group. The main observation however, is that the self-employed group has a much higher proportion within the skilled occupation group relative to the employee group in the graduate and diplomate samples (91.2 vs 86.4 percent for graduates, and 71.4 percent vs 66.2 percent amongst diplomates).

A key observation is that almost 9 out of 10 graduates, whether employees or self-employed, are in skilled occupations. A third of employees within the graduate sample are employed as Professionals, while just under a third of the sample are employed either as Technical and Associate Professionals (27 percent) or as Legislators; Senior officials and Managers (23 percent). Meanwhile 4 out of 10 self-employed within the graduate sample are employed as Legislators; Senior officials and Managers, followed by over a third (37 percent) as Professionals, and just over a 10^{th} (14 percent) as Technical and associate professionals.

Similarly, diplomates too have a high concentration of individuals within skilled occupation, 6 out of 10. It is interesting to note that diplomates have almost double a share in the semi-skilled occupations compared to graduates (32 percent versus 13 percent). The same is true within the low-skilled occupations; although the figures are very low, there is a higher proportion of diplomates than graduates within both the employee and self-employed groups.

These results indicate that we can expect individuals with higher levels of education in skilled occupations when compared to South Africa's general workforce breakdown (which includes all working age individuals regardless of education) in which semi-skilled and low-skilled occupations are the largest categories, i.e. 47 percent and 29 percent respectively (results not shown here).

Table 4.4: Distribution of occupation by employment type

	Employees		Self-employed[c]	
	Graduates[a]	**Diplomates[b]**	**Graduates**	**Diplomates**
Occupation				
SKILLED	**86.4**	**66.2**	**91.2**	**71.4**
Legislators; senior officials and managers	22.3 (0.008)	15.8 (0.007)	40.1 (0.021)	49.9 (0.022)
Professionals	37.4 (0.009)	14.0 (0.006)	37.2 (0.021)	9.9 (0.014)
Technical and associate professionals	26.7 (0.008)	36.4 (0.008)	13.9 (0.018)	11.6 (0.013)
SEMISKILLED	**12.8**	**31.5**	**7.7**	**21.7**
Clerks	8.6 (0.005)	18.4 (0.007)	0.8 (0.003)	1.3 (0.005)
Service workers and shop and market sales workers	2.8 (0.003)	7.4 (0.004)	1.7 (0.005)	7.4 (0.011)
Skilled agricultural and fishery workers	0.0 (0.000)	0.1 (0.000)	2.0 (0.005)	3.5 (0.007)
Craft and related trades workers	0.9 (0.002)	4.3 (0.004)	2.9 (0.008)	8.6 (0.012)
Plant and machine operators and assemblers	0.5 (0.001)	1.3 (0.002)	0.3 (0.002)	0.9 (0.004)
LOWSKILLED	**0.8**	**2.2**	**1.3**	**6.9**
Elementary Occupation	0.8 (0.002)	2.0 (0.002)	1.3 (0.004)	6.9 (0.011)
Domestic workers	0.0 (.)	0.002 (0.001)	0.000 (.)	0.0 (.)
Other	0.0 (.)	0.0 (.)	0.0 (.)	0.0 (.)

Source: Annual Labour Force Survey 2014.
Notes: Standard errors in parentheses. Except for N, which shows sample size, estimates are weighted using population weights.
[a] Graduate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65, not currently enrolled, and employed.
[b] Diplomate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65, not currently enrolled, and employed.
[c] The category self-employed includes both employers and own account workers.

4.5. Mean and Median Earnings

This section of the chapter presents a descriptive overview of earnings of graduates and diplomates. The Monthly Earnings for South Africans report (StatsSA, 2010) highlights the substantial differences between the earnings distribution of employees and those who are self-employed. It for this reason that I present earnings estimates for graduates and diplomates by employment type separately.

Table 4.5 provides estimates on mean and median earnings. While most literature typically provides mean estimates, I include median earnings in order to assess the extent of inequality in earnings. While I will comment on mean earnings, the inclusion of median earnings is likely to be important given the high earnings inequality in South Africa.

Given that Table 4.5 covers several characteristics, I will begin by presenting broad patterns across the table, before I delve into finer details. Firstly, it is evident from the figures below that graduates typically have much higher mean and median earnings compared to diplomates. On average mean and median earnings for graduate employees and self-employed graduates are roughly 60 percent more than that of diplomates. Secondly, self-employed graduates and diplomates have higher earnings (40 percent) relative to employees. Thirdly, mean earnings are much higher than median earnings. Mean earnings for graduate employees stand at R22 906 vs median earnings of R15 000. For diplomate employees, the difference between mean and median earnings is comparatively lower (R3 857). The difference in mean and median earnings is however, much larger when observing the self-employed sample. In this sample group graduates have median earnings of R15 000 compared to mean earnings of R51 622; while diplomates have median earnings of R10 000 compared to mean earnings of R32 165. These differences between mean and median earnings reflect the extent of inequality in the distribution of earnings, even among those with post-secondary education.

Gender

The table shows us that females, whether graduates or diplomates, have lower mean and median earnings compared to their male counterparts. Graduate female employees earn on average R18 362 while their male counterparts earn R27 655, while female diplomate employees earn approximately R5 000 less than male diplomate employees (R11 693 vs R16

391).[21] This difference is even more pronounced amongst self-employed workers, where female graduates and diplomates earn a third of what males do on average. Interestingly, while female earnings are fairly similar between the employees and self-employed worker groups, the differences are quite pronounced between males. For instance, both male graduate and diplomate employees earn a third of what male self-employed workers do (graduates: R27 655 vs R60 744; diplomates: R16 391 vs R40 354).

Race

Generally speaking, there are significant differences[22] in earnings between the various population groups when looking within the graduate and diplomate samples of employees. White graduate employees have the highest earnings (R23 229), earning a total of R1 557, R2 301, and R6056 more than the Coloured, African, and Indian/Asian population groups respectively. A similar pattern follows within the diplomate employee sample, with Whites earning R572 more than Coloureds, R5 052 more than Africans, and R7 125 more than Indians/Asians. Comparing population group earnings between the employees and self-employed groups, it is evident that earnings are much higher within the latter group. However, an interesting observation within the latter group, is that African graduates have the highest earnings, of R53 189, closely followed by Whites, with mean earnings of R52 202, while Coloureds, and Indians/Asians earn half of this (R26 520 and R25 042 respectively).

[21] From this section onwards, unless stated otherwise, earnings refer to mean earnings.

[22] An unexpected outcome is that the earnings pattern of the post-secondary sample places Indians below Africans on average, which this is out of line with the earnings pattern for the full adult sample in South Africa.

Table 4.5: Mean and Median Earnings (monthly, 2014 Rands)

	Median Earnings				Mean Earnings			
	Employees		Self-employed[c]		Employees		Self-employed	
Variable	Graduates[a]	Diplomates[b]	Graduate	Diplomate	Graduate	Diplomate	Graduate	Diplomate
N	3899	5122	699	658	3899	5122	699	658
	9021		1357		9021		1357	
All	15000 (450)	10000 (250)	15000 (800)	10000 (604)	22906 (872)	13857 (382)	51622 (9987)	32165 (6893)
Gender								
Female	14000 (500)	9800 (250)	15000 (1000)	6500 (1250)	18362 (818)	11693 (346)	22333 (2967)	12105 (1315)
Male	16000 (500)	12000 (500)	16666 (1250)	10000 (1050)	27655 (1542)	16391 (712)	60744 (13064)	40354 (9611)
Race								
African	15000 (250)	10000 (250)	15000 (2000)	7000 (1000)	20928 (1312)	11709 (335)	53189 (13397)	27691 (7512)
Coloured	12000 (600)	8000 (750)	20000 (5000)	8666 (1750)	21672 (2654)	16169 (1794)	26520 (4535)	23170 (7531)
Indian/Asian	15000 (500)	5300 (1025)	15000 (2917)	7000 (1700)	17173 (1146)	9636 (853)	25042 (3803)	13742 (4406)
White	14000 (750)	11000 (500)	15000 (1425)	12000 (1550)	23229 (1276)	16761 (974)	52203 (13520)	36641 (11424)
Age								
20 – 29	12700 (1000)	6000 (450)	15000 (1167)	6000 (1025)	17138 (1338)	10927 (812)	18429 (2348)	12138 (2763)
30 – 39	15000 (450)	10000 (500)	15800 (2250)	10000 (2000)	25746 (2046)	12353 (407)	33386 (4923)	32478 (9880)

40 – 49	15000 (100)	11853 (575)	15000 (2000)	10000 (2000)	20220 (1059)	15002 (716)	35330 (8288)	45155 (19929)
50 – 59	16000 (500)	12000 (750)	17333 (3250)	8800 (1250)	26338 (1895)	17309 (1397)	93370 (38697)	22578 (4780)
60 – 65	18000 (1250)	12000 (1250)	12500 (5750)	15000 (3292)	33377 (7766)	22721 (4884)	88927 (36826)	32421 (8679)
Field of Study								
Economics and Management Sciences	15000 (250)	10000 (750)	15000 (1250)	15000 (3250)	24908 (2066)	13775 (665)	52666 (28682)	58513 (26995)
Education	14000 (500)	10500 (250)	10000 (2542)	7000 (1250)	15320 (673)	11142 (286)	15824 (3392)	15656 (2562)
Engineering, the Built Environment and Information Technology	16700 (625)	9700 (988)	30000 (4875)	8800 (750)	27734 (2656)	15497 (1233)	51481 (14402)	27721 (5984)
Health Sciences	15000 (1000)	10000 (750)	18000 (3000)	15000 (6883)	31973 (4517)	14115 (1293)	65398 (24915)	29427 (9740)
Humanities	15000 (250)	12000 (750)	15000 (2000)	7000 (1988)	20613 (1914)	13802 (1201)	73881 (27448)	18923 (6883)
Law	17000 (1250)	11853 (3125)	18200 (5083)	1500 (23875)	30511 (5182)	12993 (1407)	44487 (17011)	24381 (15182)
Natural and Agricultural Sciences	13000 (750)	13000 (1250)	20000 (10750)	15000 (5500)	27956 (4966)	20584 (2771)	59507 (16106)	35491 (7951)
Other	15000 (750)	8900 (1000)	15000 (2500)	10000 (1500)	18969 (1908)	14552 (1495)	21663 (2353)	19399 (3694)
Occupation								
SKILLED								
Legislators; senior officials and managers	18000 (875)	17000 (625)	15000 (1667)	15000 (2250)	28473 (1501)	22507 (1280)	40096 (5863)	50768 (13080)

Professionals	16500 (283)	15000 (250)	20000 (2500)	6000 (1750)	27510 (1523)	21590 (1610)	54393 (12663)	17307 (3957)
Technical and associate professionals	11000 (500)	8900 (625)	15000 (2200)	8800 (1592)	12773 (639)	10782 (395)	24088 (5265)	13024 (1628)
SEMI-SKILLED								
Clerks	7500 (752)	6500 (625)	18000 (3850)	25000 (6800)	21113 (4839)	9242 (511)	35204 (6922)	20682 (4242)
Service workers and shop and market sales workers	14000 (3375)	6000 (675)	5200 (5904)	7000 (2167)	23238 (7380)	11740 (1329)	12722 (3156)	14991 (4211)
Skilled agricultural and fishery workers			12000* (7100)	10000 (2917)			12500 (9873)	17754 (4753)
Craft and related trades workers	6000 (3850)	4800 (625)	5000* (5254)	5000 (500)	8267 (2023)	8360 (781)	13224* (3687)	7923 (1026)
Plant and machine operators and assemblers	5000* (3300)	4333* (1475)			7827* (1734)	8068* (1403)		
LOW SKILLED								
Elementary Occupation	3500 (1031)	3000 (150)	2000* (3642)	2000 (492)	4231* (602)	6027 (926)	4676	4735
Domestic workers		1800* (650)				1358* (523)		
Other								

Source: Annual Labour Force Survey 2014.
Notes: Standard errors in parentheses. Except for N, which shows sample size, estimates are weighted using population weights.
[a] Graduate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65, not currently enrolled, and employed.
[b] Diplomate sample consists of persons that have completed a bachelor's degree between the age of 20 – 65, not currently enrolled, and employed.
[c] The category self-employed includes both employers and own account workers.
Values marked with an asterisk (*) denote estimates based on less than 20 observations.

Age

It is observed that earnings generally increase with age, as age is a proxy for experience. Graduate employee earnings rise quite sharply particularly between the first and the second age categories (ages 20 – 25 years and 30 – 39 years), by R8 608 or a 50% growth rate. Earnings for diplomate employees follow a similar pattern. However, unlike graduates who experience a higher relative premium at the onset of their careers, diplomates experience a higher relative premium at the later stages of their careers (peaking at a growth rate of 31.2 percent in the last age category). This suggests that for diplomates, experience has a much larger relative premium attached to it when compared to graduates.

A similar pattern is observed for self-employed workers. Graduate and diplomate earnings double between the first and second age categories (graduates: R18 429 to R33 386, diplomates: R12 138 to R32 478), however differences between the two groups arise from this point. Diplomate earnings decline after a sharp rise in the third age category (R22 578 from R45 155), thereafter rising in the last age category (to R32 421). While graduate earnings plateau between the second and the third age categories (R33 386 and R35 330 respectively), they rise exponentially (to R93 370) in the fourth age category, before declining to R88 927 in the last age category.

Field of Study

The statistics show that graduates and diplomates, regardless of obtaining their qualifications within the same field, earn differently. Additionally, while those with qualifications in certain fields earn more, there is no earnings pattern based on field of study per se.

For instance, Health Sciences, Law, and Natural and Agricultural Sciences are the highest paying fields for graduate employees, with mean earnings of R31 973, R30 511, and R27 956 respectively. Meanwhile, the highest earning fields of study for diplomate employees are Natural and Agricultural Sciences (R20 584), Engineering, the Built Environment and Information Technology (R15 497), and a combination of Other fields (which includes Home Economics, Military Sciences, Safety in Society amongst other non-specified fields) (R14 522). Graduate employees with qualifications in the field of Engineering, the Built Environment and Information Technology earn almost double that of diplomates (R27 734 vs 15497). What graduates and diplomate employees have in common, however, is that Education is the lowest paying field; with mean earnings of R15 320 and R11 142 for each respectively. This is also true when looking at employers and own-account works, where

graduates earn R15 824, and diplomates earn R15 655 within this field of study.

Among the self-employed, graduates with qualifications in Humanities have the highest earnings. Mean earnings are more than two thirds (R73 881) the amount that graduate employees receive. Economics and Management Sciences however, is the highest earning field for diplomates. Earnings in this field are three times more (R58 512) than what diplomate employees in the same field earn. Interestingly, while Health Sciences, and Natural and Agricultural Sciences have amongst the highest mean earnings for both graduate and diplomate self-employed workers, the differences between the two are quite pronounced. Diplomates qualified in the field of Health Sciences earn less than half (R29 427) of what their graduate counterparts do (R65 397); while diplomates within the field of Natural and Agricultural Sciences earn about 60 percent (R35 491) of what graduates from the same field do.

Occupation

As observed in the table, the highest paying occupations fall within the Skilled occupation category. In particular, Legislators, Senior Officials and Managers, are the highest paid, with earnings of R28 473 and R22 506 respectively for graduate and diplomate employees, followed by Professionals with earnings of R27 510 and R21 590 for the respective samples. Earnings between graduate and diplomate employees are more or less in line with each other within the Skilled occupations. Graduate employees employed as Legislators, Senior Officials and Managers, and Professionals earn roughly R6000 more than diplomates in the same occupations. For Technical and Associate Professionals however, there is a lower margin between graduate and diplomate earnings; with diplomates earning about R2000 less than graduates.

Service workers and shop and market sales workers which fall under semi-skilled occupations are the third highest paying occupations for both graduate and diplomate employees with mean earnings of R23 238 and R11 740 respectively. Earnings differentials for graduate and diplomate employees employed as Clerks is quite high, with diplomates earning 44 percent less than graduates. Meanwhile Craft and related trades workers and Plant and machine operators and assemblers are the lowest paying semi-skilled occupations. Diplomates employed as Craft and related trades workers earn more or less the same as graduates (R8 361 for diplomates vs R8 267 for graduates). Meanwhile diplomates employed as Plant and machine operators and assemblers earn R8 068, about R241 more than

graduates.

As we can expect, Elementary occupations and Domestic services are the lowest paying occupations, but there are very few observations in these categories.

Graduate professionals, the highest paying occupation amongst self-employed workers, have mean earnings of R54 393, approximately twice as high as graduate employees, and three times more than diplomate self-employed professionals. Interestingly, diplomate self-employed workers employed as Legislators, Senior Officials and Managers earn more than graduates (R50 768 vs R40 096). Both these groups however, earn in excess of 40% more than their employee counterparts. Technical and Associate Professionals too, earn more than their employee counterparts. It is evident below, that self-employed workers in semi-skilled and low skilled occupations do not earn much higher than employees.

Broadly speaking skilled occupations have much higher earnings when compared to semi-skilled and low-skilled occupations. The high demand for skilled labour against the backdrop of shortages of skilled labour supply within the economy may possibly drive (or create) the earnings premium within these occupations when compared to semi-skilled and low-skilled labour supply which is likely to be in excess of what is demanded within the economy, thus driving the earnings premium downward.

4.6. Summary

Making use of the 2014 QLFS Annual Dataset, this chapter presented a descriptive analysis of the characteristics of graduates and diplomates in South Africa. The findings in this section, in line with the literature on South Africa's labour market, uncover some of the key factors that are likely to contribute to labour market outcomes (i.e. race, gender, age and location). For instance, the general statistics show that the African population group, despite being the largest in the country, is highly underrepresented within higher education. This is somewhat unsurprising as it reveals the extent of inequality within higher education – an issue which the DoE has sought to address.

Another key finding, quite contrary to what was anticipated, is that differences in field of study profile do not differ as significantly between graduate and diplomate samples as expected. As mentioned previously, degrees and diplomas are typically offered across different fields, however except for a few categories such as Law, Engineering, the Built

Environment and Information Technology, and Humanities the distributions were not very different. However, field of study was shown to be correlated with employment outcomes and particularly earnings. The extent to which field of study alters employment and earnings outcomes in a multivariate context will be tested in Chapter 5.

In addition to showing that graduates, whether employees or self-employed workers, typically earn more than diplomates, when comparing earnings between employees and self-employed workers (graduate and diplomates), it is evident that there seems to be an earnings premium to being self-employed. Earnings also differ across individual characteristics observed, such as gender, race and age, the latter probably reflecting experience. The next chapter will explore the graduate employment and earnings premium in more detail, controlling for these characteristics in a multivariate context.

Chapter 5: Regression Analysis

5.1. Introduction

While Chapter 4 presented some stark differences in labour market outcomes between graduates and diplomates, it is necessary to analyse these differences in a multivariate context, controlling for the characteristics of the post-secondary sample. This chapter thus presents the results of the regression analysis of employment outcomes and earnings among graduates and diplomates. Section 5.2 presents the findings from the employment probit, while Section 5.3 presents the findings from the OLS estimation of the earnings function.

5.2. Discussion of Employment Probit Results

The estimations of the employment probits provide the probability of an individual with post-secondary education being employed given a set of individual, geographic, and field of study characteristics. Five sets of regressions are estimated, each one progressively adding different characteristics. Given that my main focus is understanding the differences in labour market outcomes among those with post-secondary education, and particularly between graduates and diplomates, the key variable of interest is the graduate dummy (equal to 1 if a graduate, 0 if a diplomate). Table 5.1 shows how the graduate dummy changes across the different model specifications, as additional variables are added to the model.

In the first specification I test the probability of a graduate securing employment relative to being either searching or non-searching unemployed (as explained in Chapter 3 the broad definition is used here). As expected the graduate dummy is positive and significant (a coefficient of 0.31), which suggests that graduates have a higher probability of finding employment when compared to diplomates.

The second specification includes individual characteristics, namely gender, race and age, to test whether these factors help explain the graduate premium in the probability of employment. Indeed, the findings suggest that individual characteristics absorb some of the premium, as the coefficient of the graduate dummy falls in this specification (to a coefficient of 0.23).

With respect to the results on the characteristics included, the female dummy is negative and significant in all but one specification (Specification III), indicating that females are less likely to be employed when compared to males among those with a post-secondary education. Race is indeed a significant determinant of the probability of securing employment, an outcome that is consistent across all the model specifications. In particular, the results reflect that Coloured, Indian/Asian and White individuals, relative to Africans, are more likely to be successful in their employment search. As expected, the age dummy variables are positive and significant across all the specifications of the employment probit, and increase with age. This potentially highlights the incidence of youth unemployment even amongst graduates (Bhorat et al, 2012). Additionally, individuals in the 40 – 49, 50 – 59, and 60 – 65 age brackets have the largest coefficients, which may possibly be attributed to an experience premium. For instance, the younger generation may possibly be locked out of opportunities due to a lack of experience, whilst the older generation have had years of work training, thus making them more marketable.

In the third specification I control for geographical factors, namely the area of the residence (urban formal, urban informal, tribal areas and rural formal), and province. It is observed that these factors do not make a significant difference to the premium on being a graduate (the coefficient falls to 0.22 in specification III from 0.23 in specification II). While the inclusion of geographic characteristics does not change the correlation of the other variables, the coefficient on the female dummy now becomes insignificant. This indicates that, among those with post-secondary education, an individual's gender does not have any impact on their probability of securing a job when controlling for geographic factors. The results show that only one of the three areas is significant. In particular, living in a tribal area is likely to impact negatively on an individual's probability of securing employment relative to those in urban formal areas. This outcome remains negative and significant even in the last two specifications. This finding is not surprising given the high concentration of the more educated in the skilled occupations, which are likely to be located in more formal areas. Only three out of eight provinces are significant; the Free State, Mpumalanga and Limpopo, all of which have positive coefficients. Therefore, living in any of these three provinces will prove favourable in the likelihood of securing employment relative to those that live in Gauteng. This is an interesting outcome as one would expect individuals based in Gauteng to have a much higher probability of being employed, relative to any other province. This finding is likely to suggest that economic hubs in Gauteng are saturated with educated 'job seekers',

thus making it harder to find work, unlike in the listed provinces where population density is relatively low, thus job competition may be lower among those with post-secondary education. Generally speaking, Gauteng is deemed to be a lucrative area; it attracts skilled labour, and presents a relatively higher standard of living which then necessitates higher wages. Therefore, given this perception, people quite possibly leave Mpumalanga and Limpopo to seek better opportunities in Gauteng.

Field of study is introduced in specification IV, with the results yet again pointing to a limited absorption of the graduate premium following the inclusion of the additional controls. The coefficients of the other characteristics are largely unchanged, with the exception of the age dummies, where the coefficients decline somewhat. Only three out of seven fields of study are significant - Education, Engineering, the Built Environment and Information Technology, and Health Sciences. The results indicate that individuals with qualifications in any of these fields have a much higher probability of being employed relative to those with qualifications in Economic and Management Sciences, the omitted category. While indeed those with qualifications in the field of Economic and Management Science have in general been quite successful within the labour market, these findings possibly allude to a relatively higher demand (and opening of jobs) for those with qualifications in each of the aforementioned sectors. This is possibly in line with the country's drive to fill supply shortages of individuals with such qualifications within the labour market.

As alluded to in the literature, as well as the descriptive statistics, labour market outcomes between the two groups differ not only based on the type of qualification (degree or diploma) but are also likely to differ based on field of study. Even if diplomates and graduates fall within the same general field of study, the level of work or the more specific subjects covered by diplomates relative to graduates may result in different outcomes. I therefore include interaction terms between being a graduate and the different fields of study in the last specification. This is done in order to test whether or not the association between field of study and the probability of being employed is influenced (or differs) based on whether or not one is a graduate or diplomate. Surprisingly, there is a limited interaction between these variables. The findings suggest that only one interaction, being a graduate in the field of Natural and Agricultural Sciences, is significant. The negative coefficient indicates that graduates within this field have a lower probability of being employed relative to diplomates

within the same field. Under this specification, Natural and Agricultural Sciences becomes significant.

Table 5.1: Employment Probit

Dependent variable: Probability of Employment	**I**	**II**	**III**	**IV**	**V**
Graduate	0.313***	0.231***	0.223***	0.225***	0.331***
	(0.041)	(0.040)	(0.041)	(0.043)	(0.073)
Individual characteristics					
Female		-0.080*	-0.078	-0.119**	-0.110**
		(0.039)	(0.040)	(0.042)	(0.042)
Coloured		0.389***	0.368***	0.376***	0.369***
		(0.076)	(0.096)	(0.095)	(0.095)
Asian / Indian		0.418***	0.374***	0.375***	0.370***
		(0.094)	(0.096)	(0.096)	(0.096)
White		0.686***	0.652***	0.689***	0.678***
		(0.057)	(0.066)	(0.067)	(0.067)
30 – 39		0.648***	0.639***	0.621***	0.624***
		(0.048)	(0.049)	(0.049)	(0.049)
40 – 49		0.858***	0.856***	0.749***	0.764***
		(0.055)	(0.055)	(0.056)	(0.056)
50 – 59		0.983***	0.980***	0.852***	0.862***
		(0.067)	(0.067)	(0.072)	(0.073)
60 – 65		0.978***	0.995***	0.855***	0.877***
		(0.124)	(0.126)	(0.129)	(0.129)
Geographic characteristics					
Urban Informal			-0.201	-0.186	-0.216
			(0.142)	(0.148)	(0.148)
Tribal Areas			-0.363***	-0.431***	-0.434***
			(0.057)	(0.061)	(0.061)
Rural Formal			0.243	0.225	0.207
			(0.191)	(0.193)	(0.193)
Western Cape			-0.020	-0.038	-0.038
			(0.084)	(0.086)	(0.085)
Eastern Cape			0.068	0.014	0.006
			(0.067)	(0.068)	(0.069)
Northern Cape			0.047	0.006	0.002
			(0.105)	(0.108)	(0.108)
Free State			0.150*	0.098	0.097
			(0.072)	(0.073)	(0.074)
KwaZulu-Natal			0.103	0.057	0.055
			(0.063)	(0.065)	(0.065)

North West			0.098 (0.084)	0.091 (0.085)	0.098 (0.086)
Mpumalanga			0.216* (0.087)	0.192* (0.087)	0.192* (0.087)
Limpopo			0.186* (0.077)	0.184* (0.080)	0.177* (0.080)
Field of Study					
Education				0.424*** (0.077)	0.429*** (0.096)
Engineering, the Built Environment and				0.123* (0.058)	0.167* (0.069)
Health Sciences				0.367*** (0.095)	0.345** (0.118)
Humanities				-0.039 (0.066)	0.065 (0.093)
Law				0.048 (0.118)	-0.016 (0.206)
Natural and Agricultural Sciences				0.096 (0.103)	0.568*** (0.140)
Other				0.024 (0.075)	0.068 (0.087)
Interaction Variables					
Graduate*Education					-0.036 (0.137)
Graduate*Engineering, the Built Environment and					-0.128 (0.126)
Graduate*Health Sciences					0.104 (0.181)
Graduate*Humanities					-0.246 (0.134)
Graduate*Law					0.030 (0.253)
Graduate*Natural and Agricultural Sciences					-0.904*** (0.197)
Graduate*Other					-0.138 (0.169)
_cons	1.172*** (0.023)	0.502*** (0.043)	0.512*** (0.052)	0.477*** (0.061)	0.437*** (0.066)
N	13419	13419	13419	13419	13419

Source: Own calculations, Labour Force Survey 2014.

Notes: 1. Standard errors are in parentheses. 2. Estimates are for all persons that have completed either a diploma or a bachelor's degree between the age of 20 – 65 and not currently enrolled. 3. Data are weighted to represent population estimates. The omitted categories are Africans, Ages 21 – 29 years, Urban Formal, Gauteng Province, Economics and Management Sciences, Graduate*Economic and Management Sciences.

* Significant at the 90 percent confidence level.

** Significant at the 95 percent confidence level.

*** Significant at the 99 percent confidence level.

The results from the sensitivity test show that the graduate premium remains, even when (a) using the strict definition of unemployment as the dependent variable, and (b) including the NEA group into the dependent variable. In both instances however, the graduate premium varies from the original set of regressions above (coefficient of between 0.22 and 0.31 when using (a) – and a coefficient of between 0.16 and 0.23 when using (b)). Broadly speaking the results from (a) are more or less in line with the original set of regressions presented and discussed in this chapter, however in the case of (b) there are a number of differences in which I will discuss briefly.

Firstly, while females remain less likely to be employed relative to their male counterparts, it is observed that their outcomes are much worse when compared to females in the original set of regressions (coefficient of between -0.39 and -0.42 across the different specifications). This is perhaps unsurprising in the context of the NEA group in which there is likely to be a large amount of housewives[23]. When considering the race variables, only the Coloured and White population groups remain significant, although maintaining their respective signs, while the results of the Indian population group become insignificant. Meanwhile, contrary to the original set of regressions as well as those run using (a) individuals in the 60 – 65 age brackets are less likely to be employed relative to those in the 20 -29 age bracket. In this instance the argument raised above, that 'experience' makes the older age groups more marketable in the job market, does not apply. Given that the dependent variable includes the NEA group, it is likely that this outcome is a result of a large amount of individuals that have already retired.

5.3. Discussion of OLS estimation of Earnings Function

This section presents a discussion of the earnings estimates, and as mentioned in the methodology chapter the earnings function is estimated using the reduced sample of graduates and diplomates who are employed. The dependent variable here is the log of hourly earnings, while the main variable of interest is the graduate dummy, which will be observed across the different specifications. A total of six model specifications are conducted, the first testing the bivariate relationship between earnings and the graduate variable; the second

[23] The Not Economically Active group typically consists of housewives, students/scholars, pensioners and the incapacitated. The observed group is unlikely to consist of students/scholars and the retired as I restricted my sample to those that are 'not currently enrolled' and those between the ages of 20 – 65 years. This group does not however completely rule out all those that have retired as it may be the case that a considerable amount of individuals may have retired. In South Africa's context 60 could be considered as the retirement age, and 65 as 'late retirement'.

adding individual characteristics; the third including geographic characteristics; the fourth introducing field of study; the fifth including interaction terms between the graduate dummy and field of study; and the final including job characteristics (occupation, and a dummy distinguishing employee from self-employed).

The results presented below reveal a significant earnings premium to being a graduate, in line with the descriptive statistics, and in line with the results on the probability of being employed. Specification I indicates that graduates earn 55 percent more than diplomates. This, as alluded to in the literature, possibly suggests the higher returns associated with higher cognitive skills.

Specification II, which includes individual characteristics shows a decline, albeit marginal, in the graduate earnings premium. Graduate earnings are now estimated to be 59 percent higher than that of diplomates. When considering individual characteristics, it is observed that females earn less than their male counterparts. In particular, females earn 16 percent less than males. This outcome is unsurprising given the findings ascribing gender as a key determinant of earnings, as presented in Table 4.5 of the descriptive statistics. The results also point to an earnings premium amongst the White population group relative to the African population group, with Whites earning 27 percent more than Africans. Meanwhile, the Indian/Asian population group are estimated to earn just under 20 percent less than Africans. This outcome is contrary to the general earnings patterns in South Africa wherein the Indian/Asian population group typically earn more than Africans. This suggests that the graduate/diplomate sample has a different race-earnings structure to the full sample of employed.

The results from Specification III indicate that the graduate earnings premium remains significant. The variables presented in Specification II barely change with the inclusion of geographic characteristics. The results reveal that Urban Informal and Rural Formal areas have a negative correlation with earnings. Ultimately, individuals who reside in these areas earn approximately 32 percent and 46 percent less than those within Urban Formal areas. This is expected as the cost of living in urban areas tends to be much higher than in rural areas, often necessitating higher wages within those areas too. Looking at the relationship between earnings and provinces, it is observed that the Eastern Cape and KwaZulu-Natal have a negative relationship with earnings. This suggests that both of these provinces offer less earnings than the Gauteng province (approximately 23 and 21 percent less respectively);

while the North West offers around 30 percent more than Gauteng for the those with post-secondary education.

The results from Specification IV, which controls for field of study, again show very little difference in the graduate coefficient, which only drops marginally to 0.396 from 0.406 in Specification III. Contrary to the findings of Bhorat et al (2012), who find that when controlling for field of study, there is no differential in earnings on the basis of gender and race, the results here show that even when controlling for field of study, race and gender remain significant determinants of earnings. This suggests that individuals that had an advantage in securing employment, based on gender or race (as suggested in the employment probit), clearly have an earnings advantage once they are employed. Moreover, the results reveal that earnings for those within the field of Education are 12 percent lower than those who hold qualifications in Economic and Management Sciences. Meanwhile there is an earnings premium within Health Sciences relative to Economics and Management Sciences, with earnings estimated at 21 percent higher.

When the interaction terms are included in Specification V, the graduate premium falls from 60 percent to 54 percent (what it was in the fourth specification). The field of Education becomes insignificant, while all other variables remain unchanged. Natural and Agricultural Sciences becomes significant in this specification, offering 30 percent more earnings than the field of Economics and Management Sciences. Only one of the interaction variables is significant in its relationship with earnings. Graduates within the field of Natural and Agricultural Sciences are estimated to have a negative correlation with earnings, earning roughly 89 percent less than Diplomates in the field of Natural and Agricultural Sciences.

In the final specification, which introduces job characteristics, graduates are estimated to earn only 27 percent more than what diplomates earn. This suggests that a large part of the graduate premium, almost half, is due to graduates obtaining more skilled and higher-paying occupations than diplomates. Females go from earning 17 percent less than males in Specification V, to 11 percent less in Specification VI, suggesting that women are found in the lower-paying occupations. Meanwhile the relationship between Indians/Asians and earnings becomes more significant, indicating that this population group earns roughly 33 percent less than the African population group, while the significance of the White population group falls off. There are also a number of observed changes even amongst the age dummies. The coefficients for the last three age categories fall, indicating that when job

characteristics are controlled for, the earnings premium based on age becomes smaller. Interestingly being an employee does not have a significant bearing on earnings relative to employers and own account worker. However, as one would expect the type of occupation does have a significant bearing on earnings. All occupations have a statistically significant negative return relative to Legislators, Senior Officials and Managers. Occupations within Semi-skilled and Low-skilled classifications earn much less relative to those classified as Skilled. Professionals and Technical and Associate Professionals earn 18 percent and over 100 percent less than Legislators, Senior Officials and Managers. Semi-skilled occupations earn between 92 percent and 328 percent less than Legislators, Senior Officials and Managers, while Low-skilled occupations earn over 300 percent less than Legislators, Senior Officials and Managers. This outcome is expected, more especially the earnings differentials within the Semi-skilled and Low-skilled occupations. It is however, surprising that even though the Technical and Associate Professionals group is classified as a skilled occupation, the earning differential is quite large when compared to the other occupations also classified as skilled. This is likely to be due the nature of jobs classified within this field; such as social workers and primary and pre-primary teaching staff which tend to be considered 'secondary' labour market occupations (traditionally undervalued jobs)[24].

[24] These jobs typically require minimum training, and have traditionally been low-paying jobs.

Table 5.2: Earnings Function

Dependent variable = log(hourly earnings)	**I**	**II**	**III**	**IV**	**V**	**VI**
Graduate	0.447*** (0.033)	0.412*** (0.033)	0.406*** (0.033)	0.396*** (0.034)	0.458*** (0.067)	0.236*** (0.068)
Individual characteristics						
Female		-0.150*** (0.032)	-0.148*** (0.031)	-0.162*** (0.032)	-0.156*** (0.032)	-0.100** (0.032)
Coloured		-0.079 (0.052)	-0.051 (0.060)	-0.048 (0.060)	-0.049 (0.060)	-0.100 (0.057)
Asian / Indian		-0.179* (0.078)	-0.175* (0.080)	-0.174* (0.080)	-0.178* (0.079)	-0.284*** (0.075)
White		0.237*** (0.038)	0.245*** (0.044)	0.251*** (0.044)	0.238*** (0.044)	0.088 (0.041)
30 – 39		0.192*** (0.046)	0.176*** (0.046)	0.173*** (0.046)	0.171*** (0.047)	0.072 (0.044)
40 – 49		0.198*** (0.046)	0.188*** (0.046)	0.178*** (0.049)	0.183*** (0.049)	0.083* (0.046)
50 – 59		0.261*** (0.054)	0.255*** (0.054)	0.243*** (0.056)	0.241*** (0.056)	0.111* (0.053)
60 – 65		0.477*** (0.091)	0.457*** (0.091)	0.445*** (0.092)	0.447*** (0.093)	0.298** (0.092)
Geographic characteristics						
Urban Informal			-0.274* (0.110)	-0.269* (0.110)	-0.282* (0.111)	-0.040 (0.102)
Tribal Areas			-0.002 (0.047)	-0.003 (0.047)	-0.011 (0.047)	0.017 (0.046)
Rural Formal			-0.375** (0.125)	-0.361** (0.127)	-0.393** (0.129)	-0.282* (0.118)
Western Cape			-0.057 (0.050)	-0.058 (0.050)	-0.061 (0.050)	-0.027 (0.048)
Eastern Cape			-0.204*** (0.057)	-0.207*** (0.056)	-0.209*** (0.057)	-0.160** (0.053)
Northern Cape			-0.033 (0.121)	-0.027 (0.120)	-0.042 (0.119)	-0.029 (0.105)
Free State			-0.071 (0.052)	-0.076 (0.052)	-0.072 (0.052)	-0.023 (0.050)
KwaZulu-Natal			-0.194*** (0.048)	-0.200*** (0.048)	-0.199*** (0.048)	-0.197*** (0.046)

North West	0.261*** (0.056)	0.250*** (0.056)	0.259*** (0.056)	0.311*** (0.054)
Mpumalanga	-0.002 (0.071)	-0.002 (0.071)	0.006 (0.071)	0.064 (0.064)
Limpopo	0.102 (0.060)	0.104* (0.061)	0.101 (0.060)	0.120* (0.058)
Field of Study				
Education		-0.112* (0.044)	0.074 (0.058)	0.223*** (0.060)
Engineering, the Built Environment and Information Technology		-0.041 (0.060)	-0.075 (0.075)	-0.005 (0.071)
Health Sciences		0.187* (0.056)	0.100* (0.068)	0.103* (0.067)
Humanities		-0.003 (0.056)	0.079 (0.074)	0.086 (0.068)
Law		0.120 (0.088)	-0.038 (0.183)	0.061 (0.174)
Natural and Agricultural Sciences		-0.036 (0.095)	0.259* (0.106)	0.275** (0.103)
Other		-0.076 (0.067)	-0.081 (0.089)	0.024 (0.081)
Interaction Variables				
Graduate*Education			-0.174 (0.084)	-0.153 (0.083)
Graduate*Engineering, the Built Environment and Information Technology			0.118 (0.124)	0.060 (0.116)
Graduate*Health Sciences			-0.036 (0.116)	0.014 (0.112)
Graduate*Humanities			-0.162 (0.112)	-0.008 (0.106)
Graduate*Law			0.168 (0.209)	0.020 (0.200)
Graduate*Natural and Agricultural Sciences			-0.634*** (0.187)	-0.636*** (0.187)
Graduate*Other			0.036 (0.131)	0.077 (0.126)
Job characteristics				

SKILLED Occupation						
Professionals						-0.166* (0.046)
Technical and associate professionals						-0.741*** (0.048)
SEMISKILLED Occupation						
Clerks						-0.656*** (0.064)
Service workers and shop and market sales workers						-0.900*** (0.080)
Skilled agricultural and fishery workers						-0.879*** (0.231)
Craft and related trades workers						-1.133*** (0.131)
Plant and machine operators and assemblers						-1.458*** (0.191)
LOWSKILLED Occupation						
Elementary Occupation						-1.493*** (0.096)
Domestic workers						-1.652*** (0.240)
TYPE						
Employee						0.030 (0.061)
_cons	5.215*** (0.022)	5.062*** (0.047)	5.116*** (0.054)	5.135*** (0.061)	5.111*** (0.068)	5.664*** (0.090)
N	10337	10337	10337	10337	10337	10337

Source: Own calculations, Labour Force Survey 2014.
Notes: 1. Standard errors are in parentheses. 2. Estimates are for all persons that have completed either a diploma or a bachelor's degree between the age of 20 – 65 and not currently enrolled. 3. Data are weighted to represent population estimates. The omitted population group in all regressions is Africans. Other omitted categories include: Ages 21 – 29 years, Urban Formal, Gauteng Province, Economics and Management Sciences, Graduate*Economic and Management Sciences, Legislators; Senior Officials and Managers.

* Significant at the 90 percent confidence level.

** Significant at the 95 percent confidence level.

*** Significant at the 99 percent confidence level.

5.4. Conclusion

The main findings from the employment probit suggest that graduates have a higher probability of finding employment when compared to diplomates. This is true, even when controlling for individual characteristics (gender, race, age), geographic characteristics (area type, province), field of study, as well as the interaction of being a graduate and field of study. Indeed, while individual characteristics absorb some of the premium in graduate earnings, gender, race and age (which is a proxy for experience) have a significant independent effect on the likelihood of securing employment. Intuitively, those who live in tribal areas have a lower probability of being employed when compared to urban formal areas.

The earnings regression suggests that graduates, who according to the employment probit, are more successful in employment outcomes, retain an advantage over diplomates even past the employment screening process. That is to say that graduates have an earnings premium relative to diplomates. The same is true when considering other characteristics such as gender, race, and occupation, where for instance males, whites, and those in skilled-occupations remain with a clear benefit even in terms of earnings.

Interestingly, while field of study has a bearing on employment and earnings outcomes, it does not absorb much of the graduate premium. Essentially graduates regardless of what field they specialise in, experience a large benefit in the labour market over diplomates. While indeed, one has not been able to test the association of quality of education on labour market outcomes, or control for sample selection bias, and endogeneity, these findings nevertheless provide a meaningful contribution to the literature.

Chapter 6: Discussion and Conclusion

This dissertation has explored labour market inequality amongst those with post-secondary education in South Africa, specifically investigating employment and earnings outcomes between graduates and diplomates. The study sought to answer two main questions: 'What are the differences in the employment and earnings outcomes between graduates and diplomates in South Africa' and, 'What factors assist in accounting for these differences, with a particular focus on the field of study?'.

Making use of the 2014 QLFS Annual Dataset, a descriptive analysis of the characteristics of graduates and diplomates in South Africa was presented in Chapter 4. The descriptive statistics reveal that roughly 7.8 percent of South Africa's full adult sample (those between ages 20- 65, and not currently enrolled) have a degree or diploma. Although higher than the average of 5.1 percent for developing countries, this is comparatively low relative to advanced countries with an estimated average of 14.5 percent. Of the group with post-secondary education, there are a greater number of diplomates relative to graduates; graduates account for 43 percent of the total. The findings from Chapter 4 confirm the literature which suggests that demographic characteristics such as race and gender are correlated with unequal outcomes in higher education. Illustrating this is the finding that the African population group, despite being the largest in South Africa, is largely underrepresented in both the graduate and diplomate samples. Encouragingly, while the African population group is typically the lowest paid within the country, they are the highest paid (after Whites) when observing the graduate and diplomate samples. Elsewhere, there is evidence of entrenched inequality. For instance, females, regardless of obtaining the same qualification as their male counterparts, continue to earn much less than males. This outcome is even more pronounced for self-employed individuals. Additionally, there are clear differences in earnings between graduates and diplomates, even within the same field of study and occupations, suggesting differences in cognitive skills obtained from the respective qualifications and required across the various occupations.

In Chapter 5 I estimated employment and earnings outcomes amongst graduates and diplomates. A probit regression was used to estimate employment outcomes, while a standard OLS regression was used to estimate earnings. The main variable of interest across both estimations was the graduate dummy variable. Each estimation had a number of

specifications in which key characteristics were progressively introduced, namely, individual characteristics, geographic indicators, field of study, as well as occupational characteristics in the earnings estimation.

The main findings from the employment probit suggest graduates are likely to be more successful in obtaining employment relative to diplomates even once demographic and geographic characteristics and field of study are controlled for. The findings also illustrate that there is significant bias in an individual's chance of securing employment based on their gender, race and age. In the case of age, it makes sense that there would be some sort of advantage given that age is a proxy for experience. Meanwhile the earnings regressions indicate that even in terms of earnings, graduates are better off than diplomates, obtaining a substantial earnings premium even in the full regression specification. The reduction in the earnings premium following the introduction into the regression of the occupational categories suggests that part of the premium is due to those with a degree securing more skilled higher-paying jobs than diplomates.

A unique contribution of this study was to examine the effect of field of study on employment and earnings outcomes across all age groups, unlike most studies which only have this information for recent graduates. Interestingly, while field of study has a bearing on employment and earnings outcomes, it does not absorb much of the graduate premium, suggesting that regardless of what field graduates specialise in, they remain with an advantage in the labour market. Individuals within the fields of Education, Engineering, the Built Environment and Information Technology are more likely to be employed relative to those in the field of Economics and Management Sciences. Meanwhile those with qualifications in the field of Health Sciences have higher earnings relative to those in Economics and Management Sciences, while those from the field of Education have lower earnings. Interestingly, race and gender remained significant in the final regressions, indicating that even controlling for type of degree and field of study, women do worse than men and Africans worse than Whites in the labour market.

Broadly speaking the findings presented in this study do not discredit any of the theoretical frameworks presented in Chapter 2 (Human Capital Framework, Signalling Theory, Segmented Labour Market Theory). In fact, the findings correspond with each of these theories in one way or another. The findings illustrate that age and experience are indeed important factors when considering employment and earnings outcomes of individuals. These

factors justify the notion of knowledge and skill acquisition through time, thus enhancing productivity and earnings – one of the main assumptions of the human capital framework. Additionally, graduates are more likely to be employed compared to diplomates. This illustrates one of the assumptions of the signalling theory. Specifically, it demonstrates that during the screening process employers may make use of the type of qualification as a signal of the individual's productivity. Given that cognitive skills are used as proxy for productivity it is fairly intuitive that employers possibly attach an immediate preference towards degree holders (graduates) over non-degree holders (diplomates). Meanwhile the earnings premium for diplomates is much higher in the later stages of their careers when compared to graduates who experience a premium at the onset of their careers. This finding potentially confirms Hwang's (2016) argument that in the event that employers use the type of qualification as a proxy for productivity, those with the preferred qualification (in this case, graduates) have less of an incentive to prove themselves. Diplomates, in this instance, are more likely to work much harder in a bid to prove themselves. One could argue that diplomates are progressively rewarded with time, as they display higher productivity with experience. The finding that race and gender are generally significant in all the specifications of the employment and earnings regressions confirms the assumption made in the SLM theory, that even amongst equally skilled individuals, employment and earnings outcomes differ based on individual characteristics. These findings also confirm the findings reported by Bhorat (2004), Keswell (2004), Leibbrandt et al (2010), and Van der Burg (2010), that labour market and wage determination is South Africa tend to be segmented by race and gender, thus widening the employment and earnings inequality in the country.

This dissertation has explored labour market inequality amongst graduates in South Africa, specifically investigating employment and earnings outcomes between graduates and diplomates. There are two main findings in this regard. Firstly, I find that there are significant differences in employment and earnings outcomes between graduates and diplomates. Secondly, while demographic factors, geographic characteristics and field of study (and job characteristics) have a significant impact on labour market outcomes, these factors do not necessarily explain the premium of being a graduate. These findings potentially highlight that qualifications deemed to require and produce higher cognitive skills are more valued in the labour market, both in terms of employment and earnings. Essentially, while labour market inequalities are exacerbated by demographic and social characteristics, the type of

qualification too is an important factor in determining an individual's success and performance in the labour market.

A number of limitations arose in the statistical analysis of this study, in particular sample selection bias and endogeneity. While there are tools that can be employed to correct for these issues, this is beyond the scope of this paper and have therefore not been accounted for. Additionally, as mentioned earlier quality[25] of education is another crucial factor that is likely to have a bearing on labour market outcomes. However, given that the QLFS dataset does not collect this information this study was unable to measure the effect of quality of the degree or diploma on labour market and earnings outcomes. Nevertheless, with an appropriate dataset this will be an area worthwhile exploring in future studies.

[25] A number of papers use the type of institution attended (Historically Advantaged Institutions and Historically Disadvantaged Institutions) as a proxy for quality (Moleke 2005a, Rogan and Reynolds 2012, Bhorat et al 2012, Van der Berg and Van Broekhuizen 2012). This can be done if the dataset has the name of the institution attended such that one can sort into either one of the two categories.

Appendix

Table A.1: University of Pretoria – Field of Study by Faculty

Economics and Management Sciences	Education	Engineering, the Built Environment and Information Technology	Health Sciences	Humanities	Law	Natural and Agricultural Sciences	Theology	Veterinary Science
Accounting Sciences		Industrial Engineering	Dental Surgery	Speech-Language Pathology	LLB	Biological Sciences		
Investment Management		Chemical Engineering	Oral Hygiene	Audiology		Agricultural and Food Sciences		
Financial Sciences		Civil Engineering	Dietetics	Social Work		Physical Sciences		
Econometrics		Electrical Engineering	Nursing Science	Languages		Mathematical Sciences		
Economics		Electronic Engineering	Occupational Therapy	Industrial Sociology and Labour Studies				
Law		Mechanical Engineering	Physiotherapy	Heritage and Cultural Tourism				
Statistics		Metallurgical Engineering	Radiography	Philosophy, Politics and Economics				
Informatics		Mining Engineering	Clinical Medical Practice	International Studies				
Agribusiness Management		Computer Engineering	Medicine and Surgery	Political Studies				
Recreation and Sports Management		Architecture	Sports Science	Sport and Leisure Studies				
Entrepreneurship		Interior Architecture		Fine Arts				
Business Management		Landscape Architecture		Information Design				
Supply Chain		Construction		Visual Studies				

Management	Management	
Marketing Management	Real Estate	Music
Human Resource Management	Quantity Surveying	Drama
International Relations	Bachelor of Town and Regional Planning	
Public Management	Information Technology	
	Computer Science	
	Multimedia	
	Information and Knowledge Systems	
	Information Science	
	Publishing	

Source: University of Pretoria

Table A.2: QLFS Question 1.8 (Field of Study)

	"If Diploma, Certificate or Degree (Code 13-28 in Q1.7):In which field is .....'s highest post-school qualification?"	Graduate	%	Diplomate	%
	UNIVERSITY/TECHNIKON/COLLEGE				
1	*Agriculture or Renewable Natural Resources*	105	1.7	130	1.5
2	*Architecture or Environmental Design*	68	1.1	68	0.8
3	*Arts, visual or performing*	120	1.9	111	1.3
4	*Business, commerce or management sciences*	1167	18.4	1123	13.2
5	*Communication*	121	1.9	95	1.1
6	*Computer sciences*	143	2.3	290	3.4
7	*Education, training or development*	1660	26.1	2038	24.0
8	*Engineering or engineering technology*	353	5.6	536	6.3
9	*Health care or health sciences*	559	8.8	897	10.6
10	*Home economics*	24	0.4	30	0.4
11	*Industrial arts, traders or technology*	23	0.4	41	0.5
12	*Languages, linguistics or literature*	88	1.4	26	0.3
13	*Law*	323	5.1	104	1.2
14	*Libraries or museums*	19	0.3	12	0.1
15	*Life sciences or physical sciences*	114	1.8	52	0.6
16	*Mathematical sciences*	41	0.7	10	0.1
17	*Military sciences*	19	0.3	9	0.1
18	*Philosophy, religion or theology*	88	1.4	66	0.8
19	*Physical education or leisure*	24	0.4	18	0.2
20	*Psychology*	139	2.2	23	0.3
21	*Public administration or social services*	187	2.9	341	4.0
22	*Social sciences or social studies*	224	3.5	73	0.9
23	*Other*	288	4.5	483	5.7
	FURTHER EDUCATION AND TRAINING (FET)				
24	*Management*	63	1.0	245	2.9
25	*Marketing*	43	0.7	182	2.1
26	*Information Technology and Computer Science*	45	0.7	278	3.3
27	*Finance, Economics and Accounting*	138	2.2	197	2.3
28	*Office Administration*	29	0.5	263	3.1
29	*Electrical Infrastructure Construction*	15	0.2	79	0.9
30	*Civil Engineering and Building Construction*	25	0.4	75	0.9
31	*Engineering*	39	0.6	127	1.5
32	*Primary Agriculture*			4	0.1
33	*Hospitality*	7	0.1	89	1.1
34	*Tourism*	14	0.2	109	1.3
35	*Safety in Society*	1	0.0	47	0.6
36	*Mechatronics*	4	0.1	13	0.2
37	*Education and Development*	13	0.2	67	0.8
38	*Other*	23	0.4	139	1.6

Total	**6356**	**100**	**8490**	**100**

Source: QLFS Questionnaire 2014

Table A.3: Field of Study as per QLFS sorted under University of Pretoria Faculties

Economics and Management Sciences	Education	Engineering, the Built Environment and Information Technology	Health Sciences	Humanities	Law	Natural and Agricultural Sciences	Other
Business, commerce or management sciences	Education, training or development	Architecture or environmental design	Health care or health sciences	Arts, visual or performing	Law	Agriculture or Renewable Nature Resources	Military sciences
Management*	Education and Development*	Computer sciences		Communication			Home economics
Marketing*		Engineering or engineering technology		Industrial arts, traders or technology			Other
Finance, Economics and Accounting*		Information Technology and Computer Science*		Languages, linguistics or literature		Life sciences or physical sciences	Safety in Society*
Office Administration*		Electrical Infrastructure Construction*		Physical education or leisure		Mathematical sciences	Other*
Tourism*		Civil Engineering and Building Construction*		Psychology		Primary Agriculture*	
Hospitality*		Engineering*		Public administration or social services			
		Mechatronics*		Social sciences or social studies Philosophy, religion or theology			

	Libraries or museums	

Notes: All fields marked with an asterisk represent fields from the FET institutions.
Source: Author's own assignment of field to respective faculties using the information presented in Tables 1 and 2.

Table A.4: Breakdown of field of study between Graduates and Diplomates

Field of Study	**Graduate**	**%**	**Diplomate**	**%**
Economics and Management Sciences	1454	22.9	2119	25.0
Education	1673	26.3	2105	24.8
Engineering, the Built Environment and Information Technology	692	10.9	1466	17.3
Health Sciences	559	8.8	897	10.6
Humanities	926	16.3	728	9.5
Law	323	5.1	104	1.2
Natural and Agricultural Sciences	310	4.2	327	3.4
Other	419	5.6	744	8.3
Total	**6356**	**100**	**8490**	**100**

Source: QLFS 2014 dataset, STATA.

Table A.5: Employment Probit (using the strict definition of unemployment as the dependent variable)

Dependent Variable: Probability of Employment	**I**	**II**	**III**	**IV**	**V**
Graduate	0.297***	0.215***	0.217***	0.235***	0.310***
	(0.040)	(0.043)	(0.043)	(0.045)	(0.077)
Individual characteristics					
Female		-0.101*	-0.105*	-0.140**	-0.134**
		(0.042)	(0.042)	(0.044)	(0.045)
Coloured		0.321***	0.376***	0.384***	0.379***
		(0.079)	(0.100)	(0.098)	(0.098)
Asian / Indian		0.403***	0.393***	0.399***	0.400***
		(0.099)	(0.101)	(0.101)	(0.101)
White		0.638***	0.668***	0.697***	0.690***
		(0.059)	(0.069)	(0.070)	(0.069)
30 – 39		0.632***	0.636***	0.623***	0.626***
		(0.051)	(0.052)	(0.052)	(0.052)
40 – 49		0.835***	0.839***	0.740***	0.754***
		(0.059)	(0.058)	(0.059)	(0.059)
50 - 59		0.982***	0.978***	0.867***	0.878***
		(0.069)	(0.070)	(0.075)	(0.075)
60 - 65		0.961***	0.975***	0.848***	0.868***
		(0.134)	(0.136)	(0.138)	(0.138)
Geographic characteristics					
Urban Informal			-0.199	-0.180	-0.215
			(0.148)	(0.155)	(0.155)
Tribal Areas			-0.205**	-0.265***	-0.270***
			(0.064)	(0.067)	(0.068)
Rural Formal			0.209	0.178	0.157
			(0.202)	(0.204)	(0.205)
Western Cape			-0.058	-0.076	-0.075
			(0.085)	(0.087)	(0.086)
Eastern Cape			0.055	0.012	0.001
			(0.069)	(0.071)	(0.071)
Northern Cape			0.051	0.012	0.005
			(0.109)	(0.112)	(0.112)
Free State			0.197**	0.148	0.146
			(0.076)	(0.077)	(0.078)
KwaZuluNatal			0.198**	0.161*	0.160*
			(0.068)	(0.071)	(0.071)
North West			0.220*	0.222*	0.226*
			(0.093)	(0.093)	(0.094)
Mpumalanga			0.217*	0.187*	0.185*

			(0.091)	(0.091)	(0.091)
Limpopo			0.335***	0.340***	0.335***
			(0.088)	(0.091)	(0.091)
Field of Study					
Education				0.399***	0.371***
				(0.084)	(0.103)
Engineering, the Built Environment and Information Technology				0.118	0.157*
				(0.061)	(0.072)
Health Sciences				0.286**	0.251*
				(0.098)	(0.121)
Humanities				-0.109	-0.011
				(0.067)	(0.093)
Law				0.019	0.060
				(0.127)	(0.240)
Natural and Agricultural Sciences				0.084	0.511**
				(0.116)	(0.157)
Other				0.142	0.166
				(0.083)	(0.094)
Graduate*Education					0.072
					(0.152)
Graduate*Engineering, the Built Environment and Information Technology					-0.121
					(0.132)
Graduate*Health Sciences					0.144
					(0.185)
Graduate*Humanities					-0.220
					(0.134)
Graduate*Law					-0.099
					(0.284)
Graduate*Natural and Agricultural Sciences					-0.818***
					(0.221)
Graduate*Other					-0.068
					(0.203)
_cons	1.262***	0.627***	0.571***	0.534***	0.505***
	(0.025)	(0.046)	(0.055)	(0.064)	(0.069)
N	13187	13187	13187	13187	13187

Source: Own calculations, Labour Force Survey 2014.

Notes: 1. Standard errors are in parentheses. 2. Estimates are for all persons that have completed either a diploma or a bachelor's degree between the age of 20 – 65 and not currently enrolled. 3. Data are weighted to represent population estimates. The omitted categories are Africans, Ages 21 – 29 years, Urban Formal, Gauteng Province, Economics and Management Sciences, Graduate*Economic and Management Sciences.

* Significant at the 90 percent confidence level.

** Significant at the 95 percent confidence level.

*** Significant at the 99 percent confidence level.

Table A.6: Employment Probit (including the NEA group into the dependent variable)

Dependent Variable: Probability of Employment	**I**	**II**	**III**	**IV**	**V**
Graduate	0.159***	0.159***	0.152***	0.172***	0.226***
	(0.031)	(0.032)	(0.032)	(0.033)	(0.064)
Individual characteristics					
Female		-0.386***	-0.383***	-0.415***	-0.410***
		(0.032)	(0.032)	(0.033)	(0.034)
Coloured		0.132*	0.145*	0.146*	0.142*
		(0.066)	(0.073)	(0.072)	(0.072)
Asian / Indian		-0.020	-0.054	-0.042	-0.047
		(0.071)	(0.074)	(0.072)	(0.072)
White		0.151***	0.150***	0.185***	0.173***
		(0.038)	(0.045)	(0.046)	(0.046)
30 - 39		0.518***	0.511***	0.503***	0.503***
		(0.044)	(0.044)	(0.044)	(0.044)
40 - 49		0.606***	0.603***	0.544***	0.552***
		(0.046)	(0.047)	(0.048)	(0.048)
50 - 59		0.399***	0.391***	0.310***	0.310***
		(0.047)	(0.047)	(0.051)	(0.051)
60 - 65		-0.632***	-0.637***	-0.726***	-0.726***
		(0.061)	(0.061)	(0.065)	(0.065)
Geographic characteristics					
Urban Informal			-0.161	-0.131	-0.144
			(0.126)	(0.130)	(0.129)
Tribal Areas			-0.309***	-0.345***	-0.349***
			(0.050)	(0.052)	(0.051)
Rural Formal			-0.266*	-0.266*	-0.274*
			(0.117)	(0.117)	(0.116)
Western Cape			-0.086	-0.097	-0.097
			(0.053)	(0.054)	(0.054)
Eastern Cape			0.097	0.058	0.054
			(0.057)	(0.058)	(0.058)
Northern Cape			0.128	0.095	0.092
			(0.077)	(0.078)	(0.079)
Free State			0.034	-0.005	0.000
			(0.060)	(0.061)	(0.061)
KwaZuluNatal			0.054	0.021	0.022
			(0.050)	(0.050)	(0.051)
North West			-0.009	-0.028	-0.020
			(0.071)	(0.072)	(0.072)

Mpumalanga			0.152*	0.124	0.129
			(0.068)	(0.069)	(0.068)
Limpopo			0.159*	0.146*	0.149*
			(0.067)	(0.068)	(0.068)
Field of Study					
Education				0.255***	0.320***
				(0.054)	(0.065)
Engineering, the Built Environment and Information Technology				0.107*	0.094
				(0.050)	(0.061)
Health Sciences				0.291***	0.282**
				(0.069)	(0.088)
Humanities				-0.117*	-0.058
				(0.055)	(0.079)
Law				-0.068	-0.326*
				(0.089)	(0.166)
Natural and Agricultural Sciences				-0.024	0.215
				(0.086)	(0.120)
Other				0.063	0.068
				(0.063)	(0.077)
Interaction Variables					
Graduate*Education					-0.163
					(0.099)
Graduate*Engineering, the Built Environment and Information Technology					0.070
					(0.106)
Graduate*Health Sciences					0.029
					(0.133)
Graduate*Humanities					-0.122
					(0.110)
Graduate*Law					0.323
					(0.198)
Graduate*Natural and Agricultural Sciences					-0.485**
					(0.169)
Graduate*Other					-0.003
					(0.136)
_cons	0.851***	0.703***	0.728***	0.704***	0.683***
	(0.020)	(0.041)	(0.048)	(0.054)	(0.059)
N	14846	14846	14846	14846	14846

Source: Own calculations, Labour Force Survey 2014.

Notes: 1. Standard errors are in parentheses. 2. Estimates are for all persons that have completed either a diploma or a bachelor's degree between the age of 20 – 65 and not currently enrolled. 3. Data are weighted to represent population estimates. The omitted categories are Africans, Ages 21 – 29 years, Urban Formal, Gauteng Province, Economics and Management Sciences, Graduate*Economic and Management Sciences.

* Significant at the 90 percent confidence level.
** Significant at the 95 percent confidence level.
*** Significant at the 99 percent confidence level.

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